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SUPPLEMENTAL LNAPL INVESTIGATION

**Lenz Oil Site
Lemont, Illinois**

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Lemont, Illinois**

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CONESTOGA-ROVERS & ASSOCIATES

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EXECUTIVE SUMMARY

The Lenz Oil Superfund Site (Site), located near Lemont, Illinois, is a former oil transfer and storage facility on 4.9 acres of land located at Jeans Road and Route 83. An additional area located south of Jeans Road has been impacted by past Lenz Oil operations.

In the late 1980s, the Illinois Environmental Protection Agency (IEPA) conducted remedial activities which involved removal of waste, tanks, drums, and other facilities. IEPA's remedy included the removal and on-Site incineration of approximately 21,000 tons of contaminated soil and LNAPL. The IEPA also installed an alternate water supply for local residents.

Following the IEPA remedial activity, a Remedial Investigation/Feasibility Study (RI/FS) was conducted for the Site by a group of PRPs (PRP Group) pursuant to an Administrative Consent Order. The RI/FS was focused on characterizing remaining contamination present in soil, LNAPL and groundwater. A further evaluation of the extent and nature of LNAPL contamination was conducted in 1994 by the PRP Group's contractor, ERM.

Field activities associated with ERM's LNAPL investigation were performed during a three month period which extended from August 1, 1994 through November 8, 1994. The LNAPL investigation consisted of the following activities:

- installation of 10 piezometers and nine soil borings;
- collection and analysis of three LNAPL samples;
- collection and analysis of five subsurface soil samples;
- surveying activities;
- measurement of water level and LNAPL levels on eleven occasions during a three month period; and
- bail-down testing of six monitoring wells/piezometers.

Based on the data collected during the three month LNAPL investigation, ERM estimated the surficial area of the LNAPL layer south of the excavation area at 39,100 square feet.

in the summer of 1997, oil was observed in a private well (not used for potable use) at the William's residence located on the property south of the Site. This finding, along with measurements from existing monitoring wells and piezometers indicated that the LNAPL layer defined by the RI/FS was larger than originally estimated, perhaps significantly impacting not only the cost of remedial alternatives, but the selection of an appropriate remedy. To address these concerns, the PRP Group agreed to conduct a Supplemental LNAPL Investigation and update the FS.

A Supplemental LNAPL Investigation was conducted to update the nature and extent of LNAPL, update LNAPL smear zone thickness, evaluate whether high pressure petroleum pipelines in the vicinity of the site are contributing to Site contamination and to further characterize the extent to which volatile organic compounds (VOCs) may be present in the groundwater downgradient of the LNAPL area.

Based on information collected from nine new boreholes, six new piezometers, and 42 existing monitoring wells and piezometers, CRA estimated that the LNAPL layer covers approximately 67,000 square feet. The area is shown as a shaded area on Figure 4.1 of Section 4. This area is approximately 70 percent larger than the area estimated previously during the 1994 LNAPL Investigation.

Although the LNAPL layer is now estimated to be larger than previously calculated, new data and a longer history of monitoring has allowed for refinement of the estimates made in 1994. CRA does not consider that the increase in size of the LNAPL layer is due to any significant migration but rather that the LNAPL layer is relatively immobile. The following Site data support characterization of the LNAPL layer at the Lenz Oil Site as relatively stable:

- The observation of LNAPL at the leading edge of the LNAPL layer (P24, P24S, P25, and P-25S) has been infrequent and appears to be strongly influenced by water table elevation fluctuations.

- VOCs were not detected in the groundwater samples collected from the piezometers located directly downgradient of the LNAPL layer.
- The lack of visual signs of soil staining or a smear zone in newly installed piezometers.
- The tanks, drums and impoundments on Site and much of the LNAPL on Site was removed in the late 1980s by the IEPA.

The estimated true thickness of LNAPL within the soil/bedrock formation at the three locations recently tested ranged from 0.16 feet to 1.6 feet and is considerably less than the apparent thickness. However, because this thin layer of LNAPL has been moved up and down through the soil column by water table fluctuations the soil/bedrock above and below the water table has been contaminated. This area is known as the smear zone. CRA estimates that the smear zone averages 3.5 feet across the LNAPL layer.

During the Supplemental LNAPL Investigation, three samples of LNAPL were collected and fingerprinted and have shown that the LNAPL is a mixture of motor oil and diesel fuel with VOCs. Some LNAPL was also found to contain gasoline and some samples appear to be only 2 to 7 years old, which suggests a source other than Lenz Oil. For that reason, ten soil borings were drilled along high pressure petroleum pipelines located on the western edge of the LNAPL area. These boreholes found low levels of petroleum-related compounds in shallow soils, but did not identify any significant release from the pipelines. Consequently, CRA does not consider these low level concentrations to be a result of the Lenz Oil LNAPL layer.

The Supplemental LNAPL Investigation also evaluated VOCs in groundwater downgradient of the LNAPL layer. VOCs were not detected in groundwater samples collected from piezometers located immediately downgradient of the LNAPL area. This finding supports the conclusions that VOCs in the LNAPL do not readily dissolve in the groundwater, and, to the extent small quantities of VOCs dissolve in the groundwater, they dissipate as a result of natural attenuation processes.

Additional work conducted as part of the Supplemental LNAPL investigation shows:

- no evidence of LNAPL along the northern bank of the Des Plaines River;
- that the Williams' well has been abandoned in accordance with DuPage County Department of Health requirements; and
- that levels of VOCs in the air of Mrs. William's basement existing before the well was abandoned were negligible.

USEPA and IEPA required that the Supplemental Investigation Report and the FS Addendum be submitted prior to completion of all of the monitoring rounds required as part of the Work Plan for the investigation. The Agency's expectation is that additional data obtained following submittal of these reports will confirm and support the conclusions presented therein.

1.0 INTRODUCTION

Conestoga-Rovers & Associates (CRA) was retained by the PRP Group to conduct a Supplemental LNAPL Investigation at the Lenz Oil Site (Site), located near Lemont, Illinois (see Figure 1.1). This report summarizes the recent field investigative activities completed at the Site.

The purpose of the Supplemental LNAPL Investigation was as follows:

- update the extent of LNAPL and smear zone estimates,
- update LNAPL thickness measurements,
- evaluate whether high pressure petroleum pipelines are contributing to Site contamination, and
- evaluate groundwater quality downgradient of the LNAPL area.

Figure 1.2 presents a Site plan.

2.0 SCOPE OF WORK

The scope of work for the Supplemental LNAPL Investigation was based on CRA's letter to USEPA dated August 29, 1997 and consisted of the following activities:

- monitoring of water levels and the presence of LNAPL in the residential water well and existing monitoring wells and piezometers;
- monitoring of the ambient air in the basement at the William's house where the residential well is located;
- collection of LNAPL samples from the residential water well, one monitoring well, and one piezometer for chemical analyses;
- abandonment of the residential water well;
- installation of ten soil borings adjacent to the petroleum pipeline which is parallel to the western property line of the Site;
- installation of six shallow piezometers;
- collection and analyses of groundwater samples from two existing shallow monitoring wells and three newly installed piezometers;
- modifications to the protective cover of piezometer P25;
- surveying activities;
- completion of three LNAPL recovery tests; and
- inspection of the northern bank of the Des Plaines River.

The field investigative activities discussed in this report were conducted during the period from July 31, 1997 through September 25, 1997. Piezometer and soil boring installations, fluid measurements and sample collection activities were performed in accordance with the procedures outlined in ERM's Field Sampling Plan, Addendum A, Revision 4, June 27, 1994. The following sections describe the activities conducted as part of, and summarize the data obtained from, the Supplemental LNAPL Investigation.

3.2 AMBIENT AIR MONITORING

The water well located in Mrs. William's house at Rural Route 2 and Jeans Road was located within a small off-shoot of the basement. Ambient air monitoring within the basement was conducted on July 31, 1997 using a Mine Safety Appliances (MSA) Gas Scope Combustible Gas Meter and a Photovac MicroTip Organic Vapor Analyzer. The ambient air above the water well and throughout the basement was monitored for the presence of combustible and organic vapors. No combustible vapors were detected. Organic vapors were only detected directly above the water well, immediately following the removal of the well cap. A peak reading of 2.8 parts per million (ppm) was detected above the water well. Shortly after the removal of the well cap, the organic vapor reading above the water well dropped to zero. No other organic vapors were detected in the basement.

3.3 LNAPL SAMPLING

During the first LNAPL and water level monitoring event conducted on July 31, 1997, the LNAPL observed in the residential well appeared to have a slightly different odor, color, and viscosity compared to the LNAPL in the monitoring well and piezometers also observed on that day. To evaluate the source/type of LNAPL observed, LNAPL samples were collected from the residential well, monitoring well MW-5S, and piezometer P19 (MW-5S and P19 have historically contained LNAPLs). These samples were collected on August 7, 1997. LNAPL samples were collected using a peristaltic pump and a dedicated new section of polyethylene tubing. Prior to sampling, the LNAPL levels were measured in the wells/piezometer. A new section of polyethylene tubing was lowered into the well/piezometer to the base of the LNAPL layer. The peristaltic pump was then used to draw the LNAPL from the well. LNAPL samples were analyzed for gas chromatograph hydrocarbon finger-printing and VOCs dissolved in the LNAPL. Hydrocarbon finger-printing analyses were completed by Torkelson Geochemistry, Inc. of Tulsa, Oklahoma. VOC analyses were completed by IEA of Schaumburg, Illinois.

3.4 RESIDENTIAL WELL ABANDONMENT

The William's well has not been in service since the property was connected to the County water supply and, therefore, in accordance with the Illinois Water Well Code, the water well needed to be abandoned. Shortly after oil was discovered on the well, the resident authorized the PRP Group to abandon it. Approval was obtained from the Illinois Department of Public Health (IDPH)¹ to allow Fox Exploration, Inc. of Itasca, Illinois to abandon the well. This well was abandoned on August 7, 1997.

The abandonment of the well was performed in accordance with the requirements outlined in Section 920.120 of Part 920 of the Illinois Water Well Construction Code, Illinois Administrative Code and through consultation with Mr. Wayne Melichar of the DuPage County Health Department (DCHD). Mr. Melichar was also present for the abandonment of the well. Prior to abandonment, the depth to water in the well was measured at 6.43 feet btoc, and the well depth was measured at 92 feet btoc (or approximately 94.0 feet below ground surface (bgs)). The well was abandoned by filling the well annulus with pea gravel from the base of the well to a depth of 45.0 feet btoc. Bentonite chips were then placed on top of the pea gravel to a height of five feet btoc. The remaining well annulus was filled with concrete. The annular space of the well between the five-inch casing and the outer eight-inch casing was sealed with a cement/bentonite grout. All liquids generated from the well abandonment were containerized in a DOT approved 55-gallon steel drum and stored on Site. A copy of the completed water well sealing form is provided in Appendix A.

¹ Telephone conversation between Mr. Jerry Dalsin of the IDPH and Mr. Walter Pochron of CRA.

3.5 SOIL BORINGS

Two underground petroleum pipelines (Amoco Pipeline Company and Badger Pipeline Company) run parallel to the western property line of the Site. A series of ten soil borings (BH-1 through BH-9 and P-31) were drilled adjacent to these pipelines. The soil borings were advanced to determine if significant leakage has occurred from these pipelines. Figure 3.1 identifies the location of the soil borings and their proximity to the pipelines. Fox Exploration, Inc. of Itasca, Illinois was subcontracted to provide drilling services.

The soil borings were advanced using 3 3/4-inch hollow stem augers (HSA) in conjunction with split-spoon sampling. Soil samples were collected continuously until auger or split-spoon refusal was encountered, or to a depth of ten feet bgs. A portion of each split-spoon soil sample was placed in a zip-lock bag for headspace monitoring using a photoionization detector (PID). Soil samples were examined and classified by a CRA geologist according to the Unified Soil Classification System (USCS) to define subsurface stratigraphy. Soil cuttings were containerized on-Site in 55-gallon steel drums. One soil sample each from soil borings BH-2 and BH-8 was retained for potential VOC analysis.

Upon completion, the boreholes were backfilled with bentonite. Soil boring stratigraphic logs and head space monitoring results are presented in Appendix B.

3.6 PIEZOMETER INSTALLATIONS

Six new piezometers (P-25S, P-28, P-29, P-30, P-31, and P-32) were installed at the locations illustrated on Figure 3.2. The new piezometers were installed to further delineate the southern and western extent of the LNAPL. Boreholes for the piezometers were advanced using the protocols described in Section 3.5 of this report, and monitoring wells were constructed in accordance the procedures described in ERM's Field Sampling Plan, Addendum A Revision 4, June 27, 1994. Stratigraphic and instrumentation logs for the new

piezometers are presented in Appendix C, and construction details are summarized on Table 3.3.

Each of the new piezometers was developed following installation. Table 3.4 provides a summary of the measured piezometer development parameters.

3.7 GROUNDWATER SAMPLING

On September 10, 1997, groundwater samples were collected from existing monitoring wells MW-3S and MW-6S, and piezometers P-28, P-29, and P-30 were analyzed for VOCs. These samples were collected to evaluate the potential presence of a dissolved VOC plume. Monitoring wells were purged and sampled using disposable polyethylene bailers and a new section of nylon rope. Five well volumes were purged from each monitoring well/piezometer prior to sampling. Table 3.5 provides a summary of the measured monitoring well/piezometer purging parameters. VOC analyses were completed by IEA of Schaumburg, Illinois.

3.8 PIEZOMETER MODIFICATION

The protective cover on piezometer P25 was changed from an above-grade protective casing to a flush mount roadway box at the request of Mr. Pete Tameling, the owner of the property on which the piezometer is located.

3.9 SURVEYING

The location and elevations of the newly installed soil borings and piezometers and the recently modified piezometer P25 were surveyed on September 19, 1997. Advanced Surveying & Mapping, Inc. of Batavia, Illinois was subcontracted to provide surveying services.

3.10 LNAPL RECOVERY TESTS

LNAPL recovery tests were conducted on monitoring well G106L and piezometers P19 and P20. The purpose of the LNAPL recovery tests was to determine the actual thickness of the LNAPL in the subsurface to assist with estimating the volume of LNAPL and the selection of a remedy. An LNAPL test was also attempted on monitoring well MW-5S, but equipment problems prevented the completion of this test. LNAPL recovery tests were performed by purging LNAPL/water from the monitoring well/piezometer with a disposable polyethylene bailer. The recovery of LNAPL and water into the monitoring well/piezometer was then monitored over time. Monitoring was performed using a Keck oil/water interface meter.

3.11 RIVER BANK INSPECTION

The northern bank of the Des Plaines River was inspected on September 19, 1997. The Des Plaines River is located approximately 500 feet south of Jeans Road. The river bank was inspected and no visual signs of LNAPLs discharging into the river were noted. The portion of the river inspected extended from monitoring well nest MW-3S and MW-3D westward to the Route 83 bridge.

4.0 FIELD INVESTIGATION RESULTS

4.1 LNAPL AND WATER LEVEL MONITORING RESULTS

The updated extent of the LNAPL layer is shown on Figure 4.1. The LNAPL area covers approximately 67,000 sq. feet and is 70% larger than previously estimated by ERM.

The water level data collected during the September 10 and 25, 1997 monitoring events were used to construct the groundwater contour maps presented on Figures 4.2 and 4.3, respectively. These figures illustrate a groundwater flow direction towards the south and southeast. This groundwater flow direction is consistent with the groundwater flow direction identified by ERM during their LNAPL investigations (see Appendix D for ERM groundwater contour figures). As Figures 4.2 and 4.3 illustrate, the direction of groundwater flow is not directly toward the Des Plaines River, as would be expected. The flow of shallow groundwater beneath the Site and the surrounding area appears to be influenced by the following physical features:

1. the presence of a geomembrane which lines the excavations where soil remediation was performed (see cross-hatched area on Figure 1.2);
2. an area of standing water located to the west of P08; and
3. the presence of standing water on Mr. Tameling's property located between P-29 and MW-6S.

The two areas of standing water appear to be acting as groundwater recharge areas and the geomembrane appears to be acting as a barrier to groundwater flow.

Table 4.1 presents a summary of historic groundwater elevation data for shallow monitoring wells and piezometers where LNAPLs have not been detected. Figure 4.4 presents a hydrograph of measured

4.3 LNAPL THICKNESS

It is widely accepted that the thickness of LNAPL measured in a well is not a true indication of the actual thickness of the free phase layer within the formation. (Ballesterio, et.al., 1994; Farr, et.al., 1990; and others). These studies have shown that the difference between the apparent and actual LNAPL thickness is attributed to the capillary fringe and several other factors. When the LNAPL enters the well from above the water table it will depress the water level within the well due to the difference in specific gravity between water and the LNAPL. Under static conditions, the LNAPL will rise to a height corresponding to the top of the LNAPL free surface/oil capillary fringe within the formation.

The LNAPL thickness in the well is, therefore, almost always greater than the actual thickness of LNAPL in the formation. The thickness of the LNAPL measured in a well (under static conditions) is directly affected by the specific gravity of the oil and by the capillary pressures within the formation surrounding the specific well. The capillary pressures are directly related to the grain size of the formation (i.e. the finer the grain size the greater the capillary pressures). The soils beneath the Lenz Oil Site consist of mainly silts and clays which result in a relatively thick capillary fringe beneath the Site. Because the construction of the well disrupts the capillary fringe in the formation, it creates a greater thickness of LNAPL in the well (Ballesterio, et al, 1994). Therefore, the apparent LNAPL thickness measured in monitoring wells/piezometers is approximately equal to the sum of the actual LNAPL thickness, the capillary fringe thickness and the amount of water level depression due to the differences in the specific gravity.

The thickness of LNAPL measured in any monitoring well (even under static conditions) is complex and dependent upon location-specific factors such as specific gravity and viscosity of the LNAPL, grain size of the formation, well construction techniques, and the true thickness of the LNAPL outside the well (i.e. the proximity to the source release area). Figure 4.5 presents some simple variations to the above conditions and their impact on the LNAPL

thickness. Figure 4.6 presents a simplified scenario where the water level rises and drops in the presence of a LNAPL layer.

CRA believes that the variation in the apparent LNAPL thickness observed in the monitoring wells and piezometers is related principally to water table fluctuations. For example, the average variation of the water table at the Lenz Oil Site, based upon seven year, plus history, is on the order of 3.5 feet. There are individual well variations of almost seven feet in a few locations.

During ERM's LNAPL investigations, the water table was moderately high and measurable levels of LNAPLs were not detected in piezometers P24S, P24, and P25. Some time during the three year period between ERM's investigation and CRA's supplemental investigation, the water table at the Site apparently dropped to a level where LNAPLs accumulated within the screened intervals of piezometers associated with water table fluctuations and not lateral migration is P24S, P24, and P25. As the water table level rose, the LNAPL drained out P24S but remained trapped in the casing of piezometers P24 and P25. Another example of the variability of LNAPL thicknesses in monitoring wells and piezometers associated with water table fluctuations and not lateral migration is the measured LNAPL thickness in piezometer P01. Piezometer P01 is located within the former soil excavation boundary and represents a isolated island of LNAPL which was left in place following IEPA's on-Site remediation. During ERM's 1994 investigation, the average LNAPL thickness measured at P01 was 0.15 feet. However, over three feet of LNAPL was measured in P01 during CRA's supplemental investigation, even though an additional source of LNAPL apparently had been removed and the location had been isolated. The LNAPL in P01 appears to have been trapped in the casing similar to which occurred in piezometers P24 and P25.

As a result of the significant variability of the water table elevation at the Lenz Oil Site, the free phase LNAPL layer has moved vertically within the formations. This vertical migration has resulted in the entrapment of LNAPL within the vadose zone, within the capillary fringe and within the saturated zone as discussed previously. The combined thickness of the zones

where LNAPL entrapment occurs is referred to commonly as the 'smear zone' (see Figure 4.7). CRA estimates the smear zone averages 3.5 feet across the Site. This estimate is based upon both historical and recent water level measurements and based upon a review of the boring logs from monitoring wells and piezometers located within the LNAPL layer. The 3.5 feet value is an average, consequently in some cases the smear zone may be thinner due to a smaller water table fluctuation or due to a larger average grain size of the surrounding deposits at that location. The smear zone is likely to be larger at locations where the water table rises and falls over a larger distance or where the formation grain size is smaller.

4.4 LNAPL LATERAL MIGRATION.

The LNAPL thickness and detection measurements made to date indicate that the LNAPL layer has a configuration close to that depicted on figure 4.1. This configuration covers approximately 67,000 square feet and is approximately 70% larger than the area estimated in the past by ERM during the 1994 LNAPL investigation. The main reason the LNAPL area appears to be larger in size relates to more recent detection of LNAPLs in the southern piezometers; P24 and P25 and the observation of LNAPL in the William's well. As mentioned previously, these observations are not solely due to lateral movement of the LNAPL layer, but rather the vertical movement of a thin layer which, under certain conditions does not enter the screened interval of the well.

The LNAPL layer as defined in Figure 4.1 is considered to be relatively stable and does not appear to be migrating significantly based upon data and observations obtained over a seven year period at the Site. This conclusion is supported by the following:

- 1) The detection of LNAPL in the piezometers at the estimated leading edge of the LNAPLs (P24 and P25) has been infrequent and only occurs during periods of an extremely low water table. These characteristics are commonly found at the leading edge of an LNAPL release. These

conditions have not changed over the last three years (since the piezometers were installed) which again indicate moderately stable conditions.

- 2) Groundwater samples collected from piezometers recently installed downgradient of the leading edge of the LNAPL layer (P- 28,29 and 30) did not detect any VOCs. Even with elevated concentrations of VOCs detected in the LNAPL samples, VOCs were not detected in the dissolved phase within the shallow water bearing unit. As explained in Section 4.4, it is common for natural attenuation processes to occur at the leading edges of LNAPL layer which reduce the concentrations of the VOCs dissolved in the groundwater. For stable and older, well established layers, these processes often reduced the dissolved fractions to non-detectable concentrations as is evident at the Lenz Oil Site.
- 3) There is no evidence of soil staining or a smear zone in the recently installed piezometers (P-28, 29, 30, 31, and 32) located downgradient of the leading edge of the LNAPL layer which would indicate that a LNAPL layer has traveled to those locations in the three years since the other piezometers (P24 and 25) were installed.
- 4) The tanks, drums, and impoundments on Site and much of the LNAPL on Site was removed in the late 1980s by the IEPA, and there are no known additional LNAPL sources which would act as a significant driving force to lateral migration.

In summary, when consideration is given to all the Site data, the LNAPL layer at the Lenz Oil Site should be considered stable, with little to no lateral migration.

4.5 LNAPL SAMPLING RESULTS

Hydrocarbon Finger-Printing Results

The results of laboratory analysis and hydrocarbon finger-printing of the collected LNAPL samples is presented in Appendix E. An interpretation of the LNAPL hydrocarbon finger-printing analysis by Gene W. Schmidt of GW/S Environmental Consulting in Tulsa, Oklahoma is also provided in Appendix E. The interpretation of the finger-printing analysis indicated that all of the LNAPL samples appeared to be a mixture of diesel fuel, motor oil, and at one location included gasoline. However, interpretation of the ages of the LNAPL samples varied greatly (from 2 to 20 years). These analyses suggest that the LNAPL detected in the residential well is not related to the Lenz Site. However, no source other than Lenz has been found to date.

VOC Results

The LNAPL VOC analytical results are summarized on Table 4.2 and reproduced in Appendix F. The VOC analytical results from the three LNAPL samples collected varied greatly in concentrations and constituents. The VOC results are as follows:

William's Well: The total VOC concentration in the LNAPL sample collected from the residential well was 10.5 ppm. Only two VOCs, acetone and xylenes were detected.

MW-5S: The total VOC concentration in the LNAPL sample collected from monitoring well MW-5S was 35.9 ppm. Only two VOCs, ethylbenzene and xylenes, were detected.

P19: The total VOC concentration in the LNAPL sample collected from piezometer P19 was 12,402 ppm. Twelve VOCs, consisting of chloroethane, 1,1-dichloroethene, 1,1-dichloroethane, cis-1,2-dichloroethene,

1,1,1-trichloroethane, 1,2-dichloropropane, benzene, tetrachloroethene, toluene, chlorobenzene, ethylbenzene, and xylenes, were detected.

A data validation memo validating the LNAPL VOC analytical results is presented in Appendix G.

4.6 SOIL ANALYTICAL RESULTS

As discussed in Section 3.5, soil samples were retained from soil borings BH-2 and BH-8 for VOC analysis. Table 4.3 provides a summary of the VOCs detected in the soil samples collected during the soil boring program. The presented soil analytical data, headspace monitoring results, and visual observations show no evidence of a significant release from either of the pipelines which would have effected the existing LNAPL layer. However, these data do indicate that petroleum related compounds are present in the shallow soils. Minor soil staining was observed in soil boring BH-2. Conversations with Amoco Pipeline personnel indicated a Valve House had been located near BH-2. During the removal of this Valve House, stained soils were observed by Amoco personnel. Due to the lack of soil staining in the remaining soil borings, groundwater results from P-30, and the presence of the Valve House, it is CRA's belief that this soil staining is not the result of migration of the Lenz Oil LNAPL layer.

IEA's analytical report is reproduced in Appendix F and data validation memos are presented in Appendix G.

4.7 GROUNDWATER ANALYTICAL RESULTS

Dissolved VOCs were not detected at concentrations above the detection limits in the groundwater samples collected from existing monitoring wells MW-3S and MW-6S and piezometers P-28, P-29, and P-30. These data demonstrate that a VOC plume is not present in the shallow groundwater to the south of the LNAPL area (see Figure 4.8). IEA's analytical

report is reproduced in Appendix F and data validation memos are presented in Appendix G.

Dissolved VOCs also were not detected at concentrations above the detection limits in the groundwater samples collected from existing monitoring wells MW-3S and MW-6S during the RI investigation (see figures in Appendix H which summarize the shallow groundwater analytical results from the RI). These data demonstrate that a VOC plume is not, and is unlikely to be, present in the shallow groundwater to the south of the LNAPL area.

The lack of detected VOCs on the downgradient (leading edge) of the LNAPL layer and the relatively stable nature of the LNAPL layer (refer to Section 4.2) suggests that the chlorinated aliphatic hydrocarbons (CAHs) are being transformed into innocuous products as a result of biological activity. The CAHs which are present at detectable concentrations within the LNAPL phase, are not detected directly downgradient of the LNAPL in the dissolved groundwater phase. Part of this may be due to hydrophobic nature of the CAHs in the presence of a LNAPL of organic material such as petroleum hydrocarbons. The CAHs have a tendency to stay within the organic matter within the LNAPL layer and are not preferentially dissolved into the groundwater. Another possibility for the lack of CAHs in groundwater is likely a result of their transformation by cometabolic reactions or reduction/oxidation reactions in the presence of the petroleum hydrocarbons in the LNAPL (Montoux, et. al, 1996). Both these reactions require the petroleum hydrocarbon LNAPL layer to be fairly stable, such as is the case at the Lenz Oil Site. These data indicate natural attenuation can be an effective remedial option at the Site with respect to dissolved VOCs.

Recent studies (Murray and Richardson, 1993; Vogel, 1994; McCarty and Semprini, 1994) have indicated that under aerobic conditions (as would be expected for the shallow groundwater in this area of the Site) CAHs are subject to cometabolic degradation. In this environment the CAHs are indirectly transformed by bacteria as they use the petroleum hydrocarbons (BTEX) in the LNAPL as their energy source (Wiedemeir, et al., 1996).

Another source of the transformation of dissolved CAHs in the presence of a LNAPL layer are the reduction/oxidation reactions in the groundwater. These reactions result from elevated organic substrate (e.g. a petroleum hydrocarbon plume). In this case, there is now a surplus of electron donors which increases the reducing potential of the groundwater and the CAHs are dehalogenated to innocuous transformation products (Montoux, 1996).

Either mechanism described above will result in low to non-detectable concentrations of CAHs dissolved in groundwater at locations just downgradient of a LNAPL layer. Given the known characteristics of the Lenz Oil Site and findings from similar Sites, these transformation mechanisms may be occurring on the south end of the LNAPL layer.

4.8 LNAPL RECOVERY TEST RESULTS

The data obtained from the LNAPL recovery tests performed on P19, P20 and G106L were assessed using the methods described in Gruszczenski (1987). This method of evaluation is commonly used to attempt to determine the thickness of LNAPL in the actual formation versus the apparent thickness of LNAPL measured in a well. The results of the LNAPL recovery tests are summarized on Table 4.4. These data indicate a 64 to 97 percent difference between the apparent and estimated LNAPL thickness calculated using the Gruszczenski method. Calculations estimating the actual LNAPL thickness ranged from 0.16 feet at G106L to 1.6 feet at P19². These data indicate that the actual thickness of LNAPL under the Site is only a few tenths of a foot in thickness across most of the Site, with the apparent exception of the vicinity of P19.

² The procedures and methods of estimating actual LNAPL thickness provided by Gruszczenski (1987) are subject to assumptions and underlying hydrogeologic conditions which are not satisfied at this Site. However, this method provides a qualitative approach to better understand LNAPL thickness in the formation.

Tables and graphs from the LNAPL recovery tests are presented in Appendix I.

REFERENCES

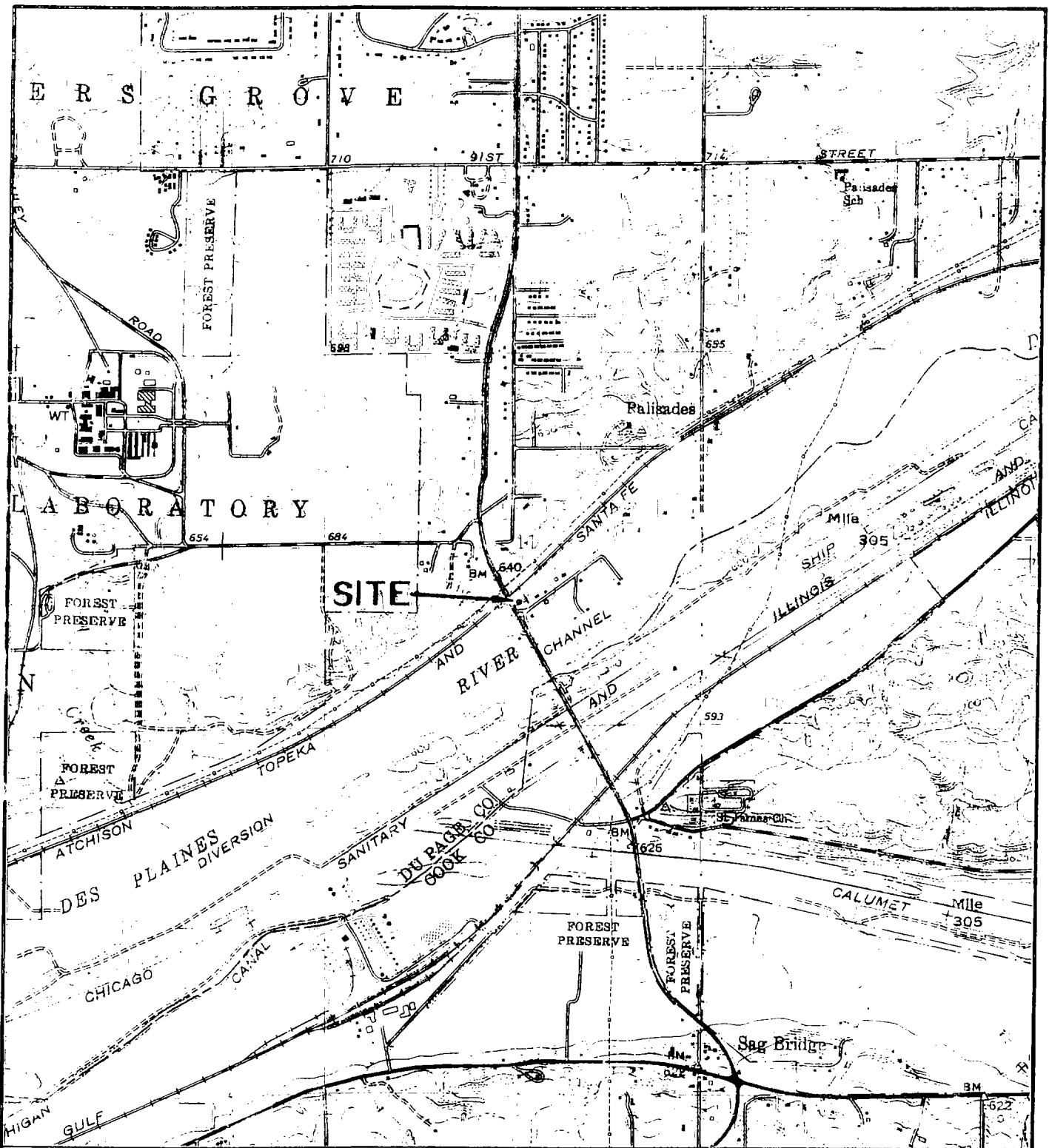
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Wiedemeir, T.H.: Wilson, J.T., Kampbell, D., Hansen, J.E., and Huss, P. 1996. Technical Protocol for Evaluating the Natural Attenuation of Chlorinated Ethenes in Groundwater. The Proceedings of the 1996 Petroleum Hydrocarbons & Organic Chemical in Ground Water Prevention, Detection, and Remediation Conference. Houston, Texas, November 1996.

FIGURES



BASE SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE;
SAG BRIDGE, ILL. 1978

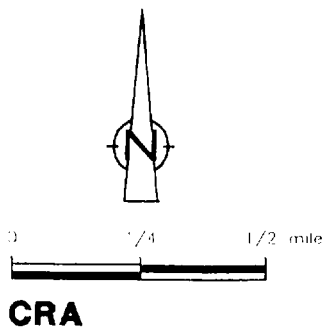
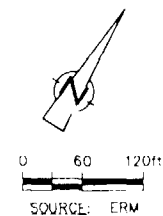


figure 1.1
SITE LOCATION
LENZ OIL SITE
Lemont, Illinois



UNDERGROUND PETROLEUM PIPELINE

AREA OF EXCAVATION

DRAINAGE DITCH

FENCE LINE

PROPERTY LINE

RAILROAD TRACKS

P02 ⊕ ERM SOIL BORING IN WHICH NO PIEZOMETER
WAS INSTALLED, AND IDENTIFIER

P01 ⊕ ERM PIEZOMETER LOCATION
AND IDENTIFIER

MW 10 ⊕ EXISTING MONITORING WELL LOCATION
AND IDENTIFIER

(7) THE EXCAVATION BOUNDARIES ARE BASED ON SKETCHES PROVIDED BY THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY FOR THE REMEDIAL INVESTIGATION REPORT PREPARED BY ERW-NORTH CENTRAL, INC. ACCORDING TO FIELD OBSERVATIONS, PIEZOMETERS P05 AND P07 ARE OUTSIDE THE AREA OF THE MAIN EXCAVATION, AND PIEZOMETER P11 IS INSIDE THE AREA OF THE MAIN EXCAVATION.

figure 1.2

SITE PLAN WITH EXISTING MONITORING WELL,
PIEZOMETER AND SOIL BORING LOCATIONS
LENZ OIL SITE
Lemont, Illinois

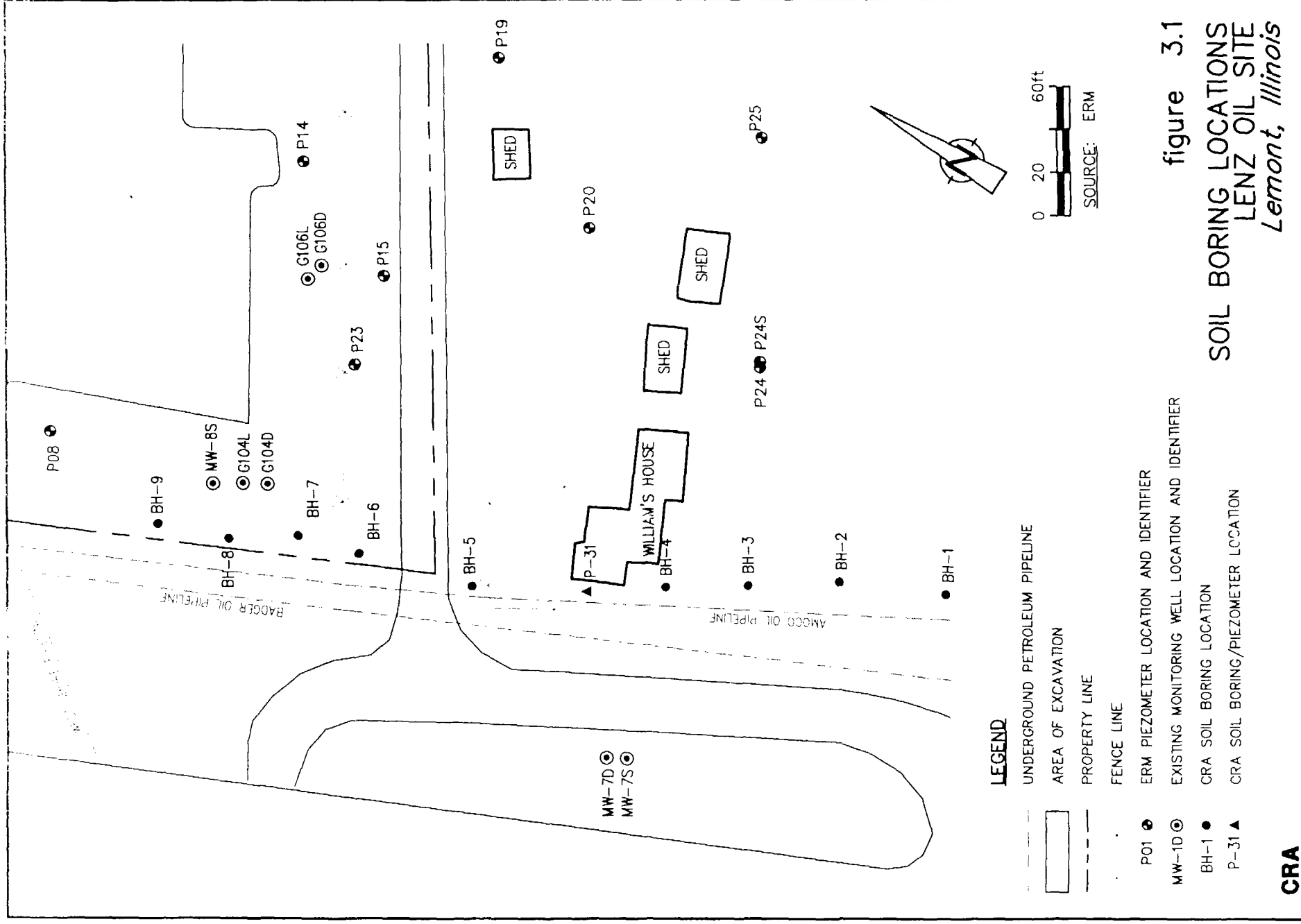
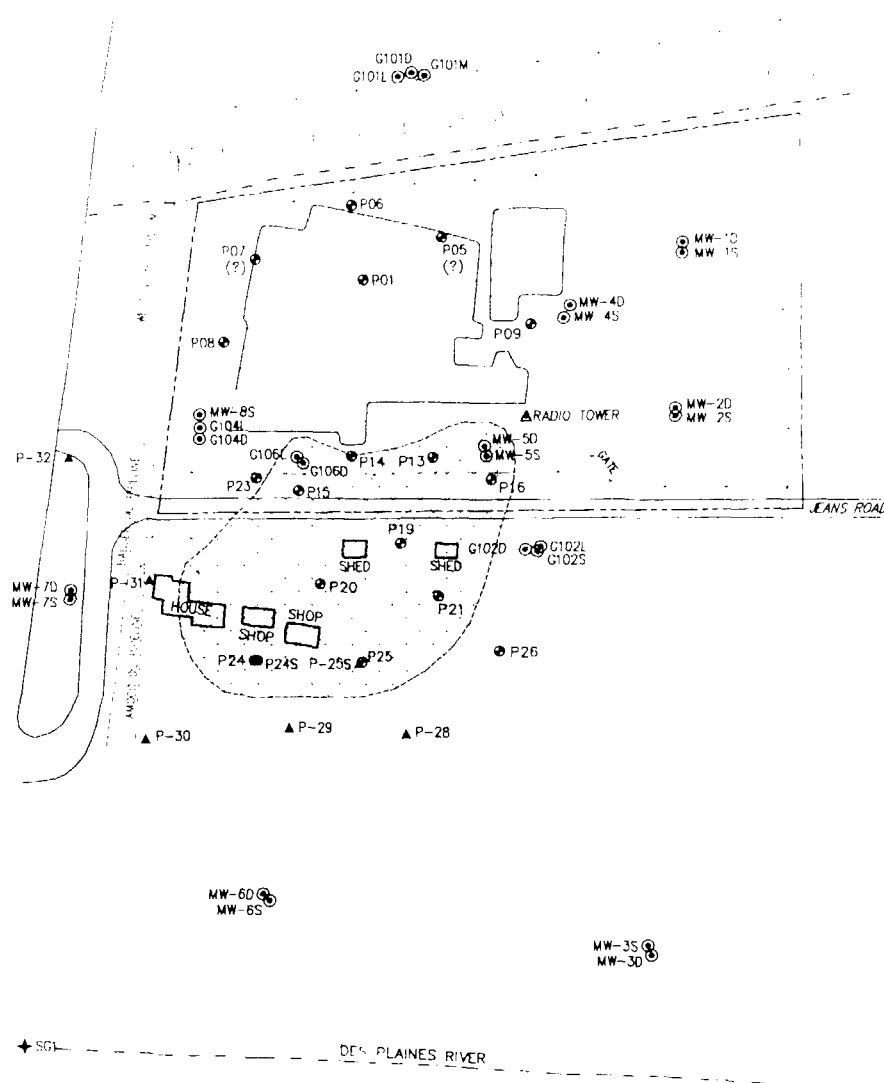


figure 3.1
SOIL BORING LOCATIONS
LENZ OIL SITE
Lemont, Illinois

CRA



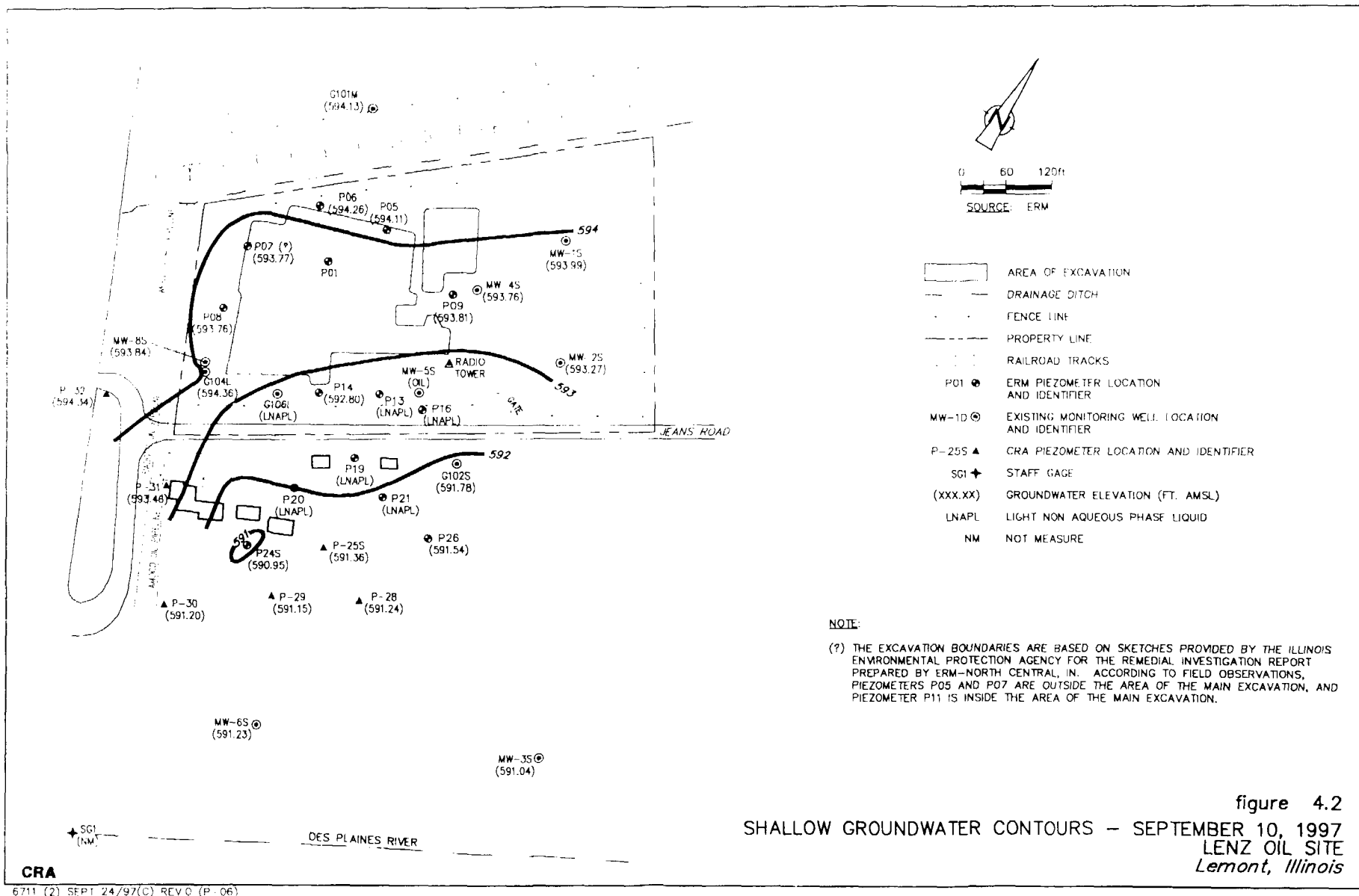
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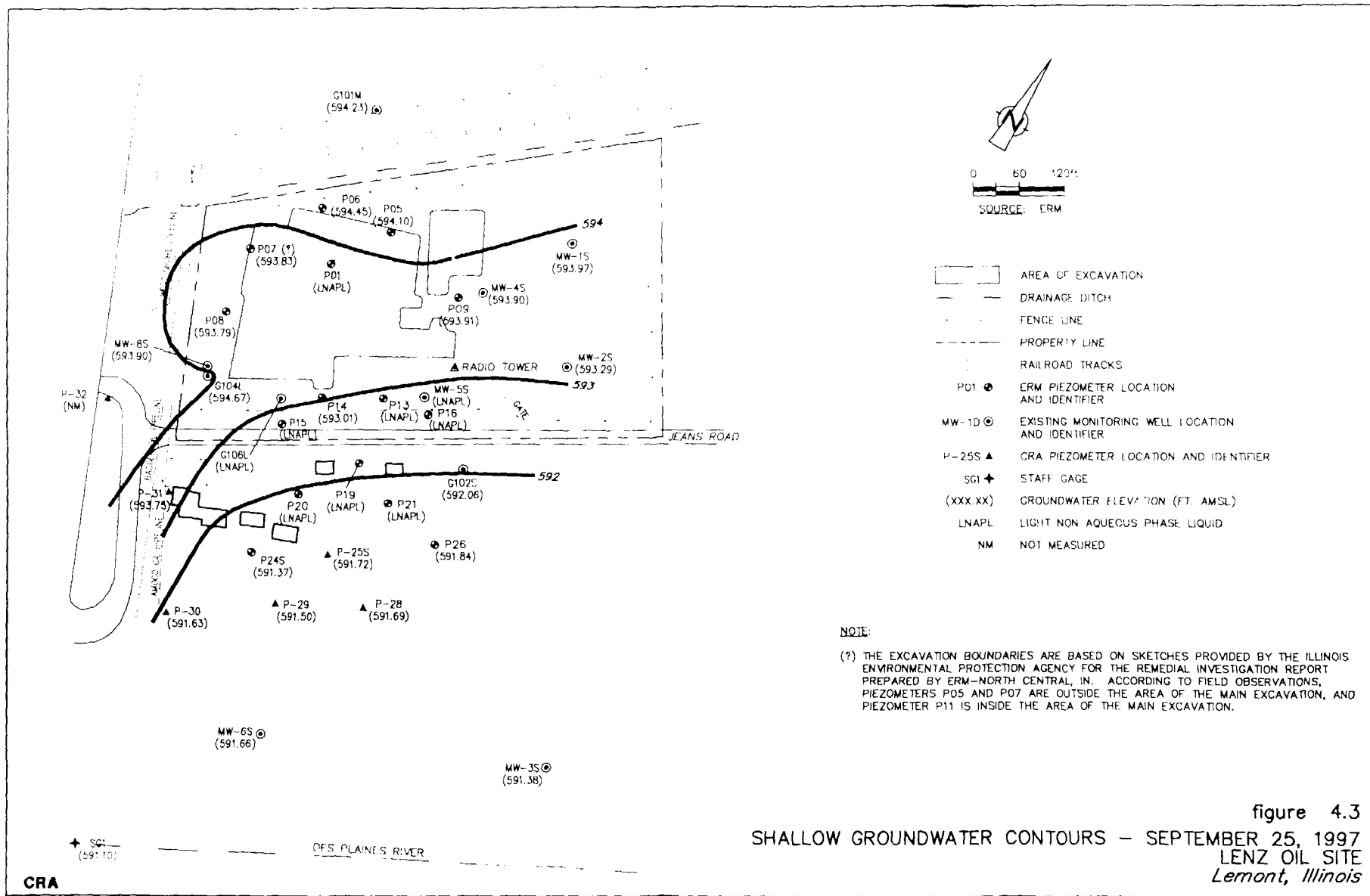
(?) THE EXCAVATION BOUNDARIES ARE BASED ON SKETCHES PROVIDED BY THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY FOR THE REMEDIAL INVESTIGATION REPORT PREPARED BY ERM-NORTH CENTRAL, IN. ACCORDING TO FIELD OBSERVATIONS, PIEZOMETERS P05 AND P07 ARE OUTSIDE THE AREA OF THE MAIN EXCAVATION, AND PIEZOMETER P11 IS INSIDE THE AREA OF THE MAIN EXCAVATION.

figure 4.1
LNAPL LIMITS
LENZ OIL SITE
Lemont, Illinois

CRA

6711 (2) SEPT 23/97(C) REV.0 (P-05)





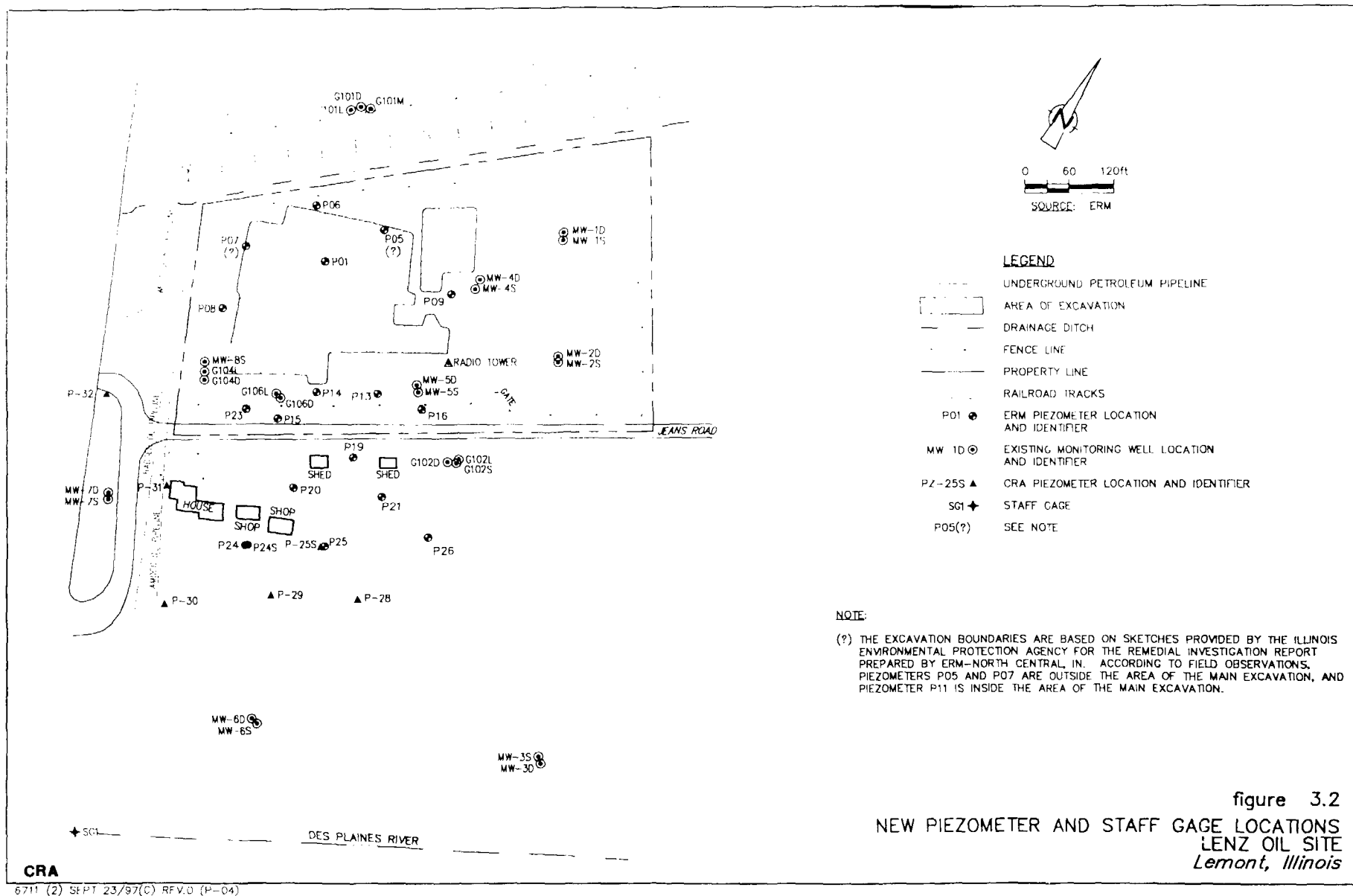
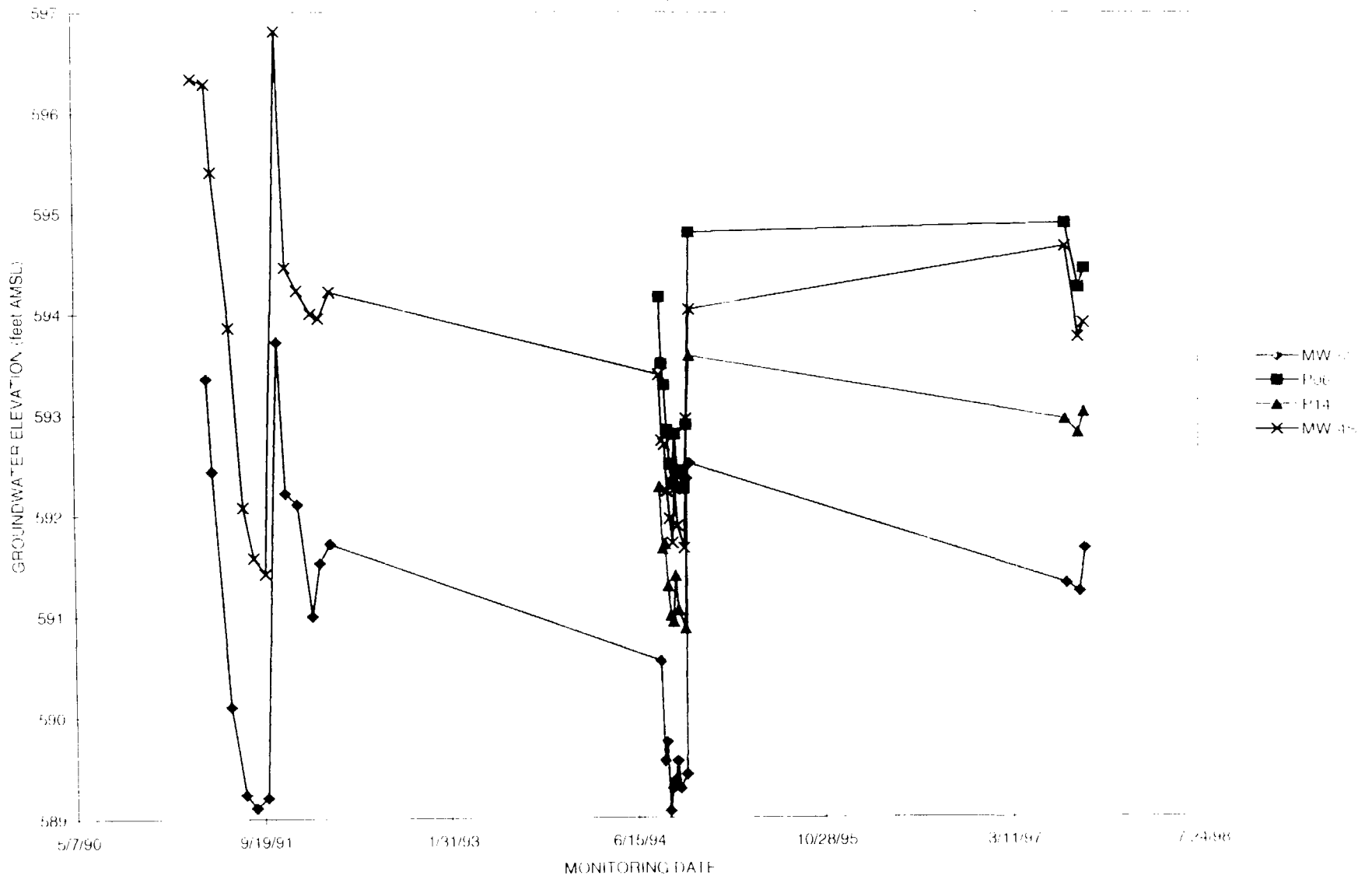
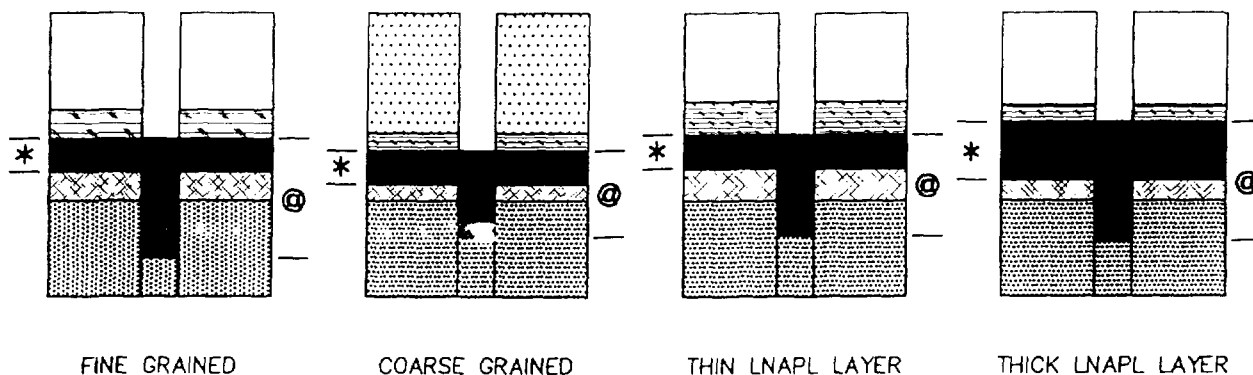


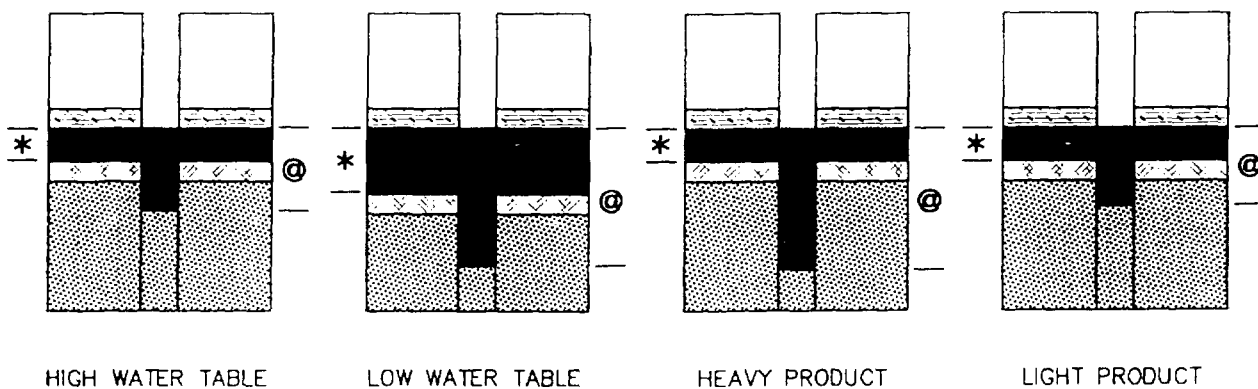
figure 3.2
NEW PIEZOMETER AND STAFF GAGE LOCATIONS
LENZ OIL SITE
Lemont, Illinois

FIGURE 4.4
HYDROGRAPH OF GROUNDWATER ELEVATIONS
LENZ OIL SITE
LEMMONT, ILLINOIS





NOT TO SCALE



NOT TO SCALE

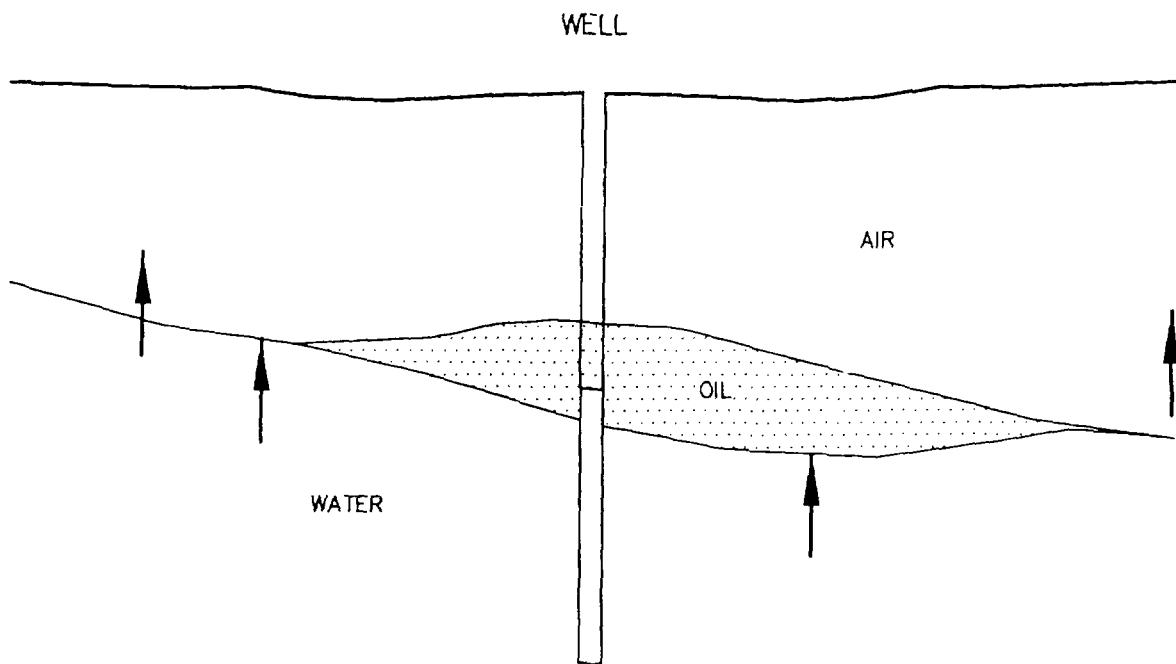
LEGEND

- * ACTUAL LNAPL THICKNESS
- @ APPARENT LNAPL THICKNESS

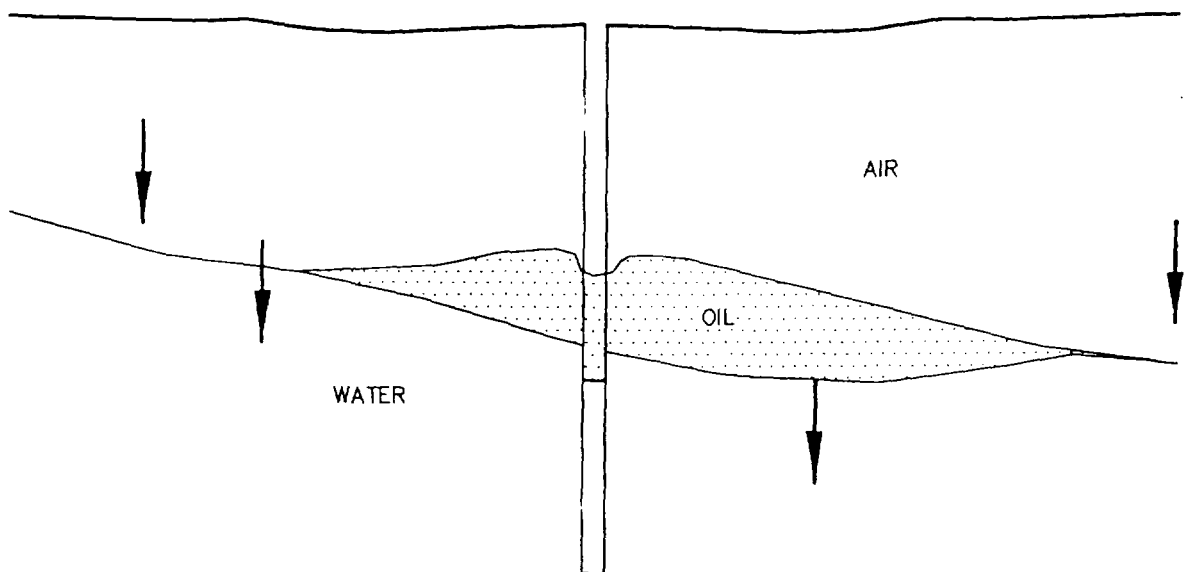
figure 4.5

SCHEMATIC OF ACTUAL VS. APPARENT
LNAPL THICKNESS IN A WELL AND ADJACENT FORMATION
LENZ OIL SITE
Lemont, Illinois

CRA



HYDROCARBON THICKNESS DECREASE FOR RISING INTERFACE
NO SCALE



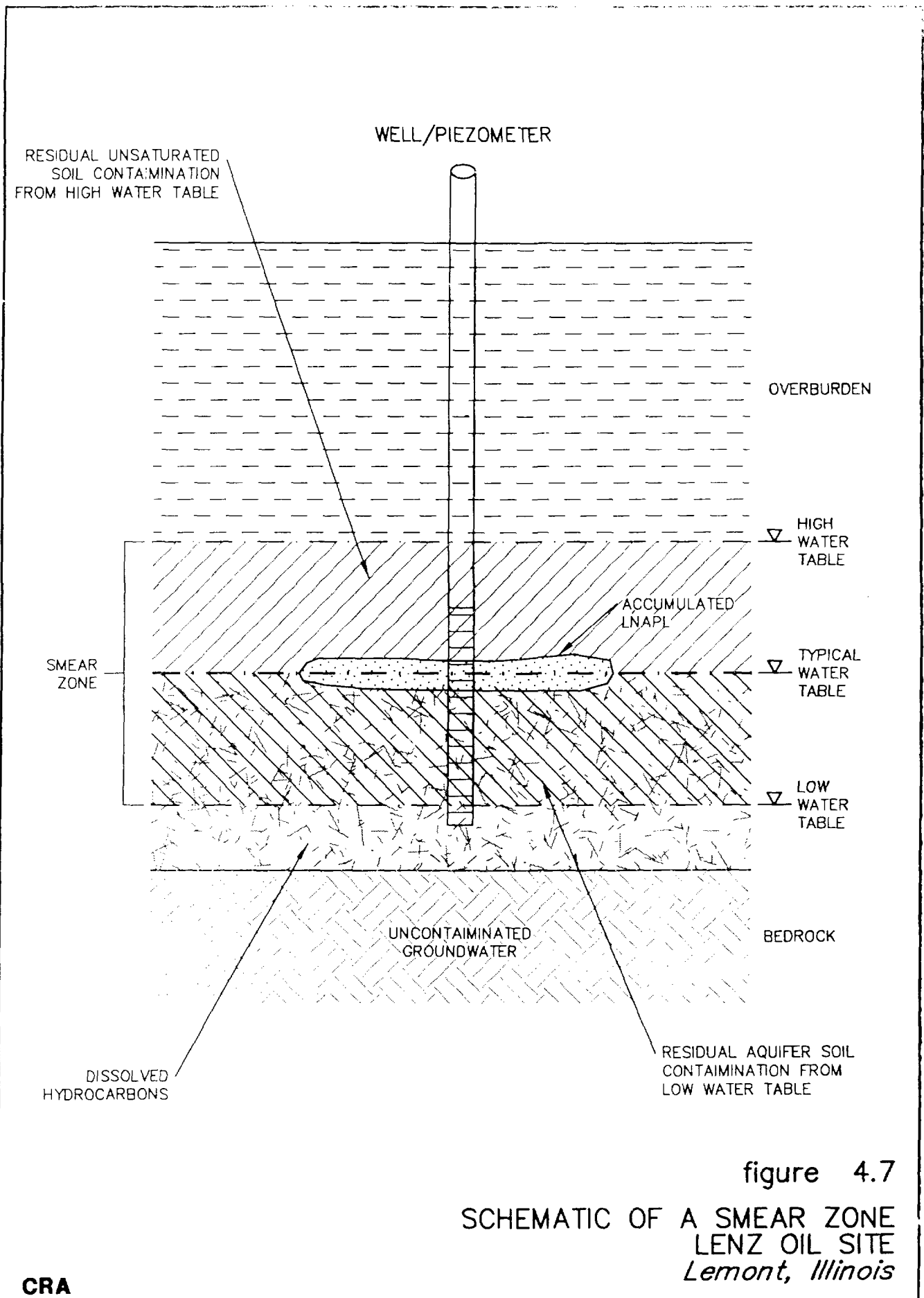
HYDROCARBON THICKNESS INCREASE FOR FALLING INTERFACE
NO SCALE

figure 4.6

EFFECT OF WATER TABLE ON LNAPL THICKNESS
LENZ OIL SITE
Lemont, Illinois

CRA

SOURCE: KEMBLOSKI, M.W.; CHIANG, C.Y. (1990)



CRA

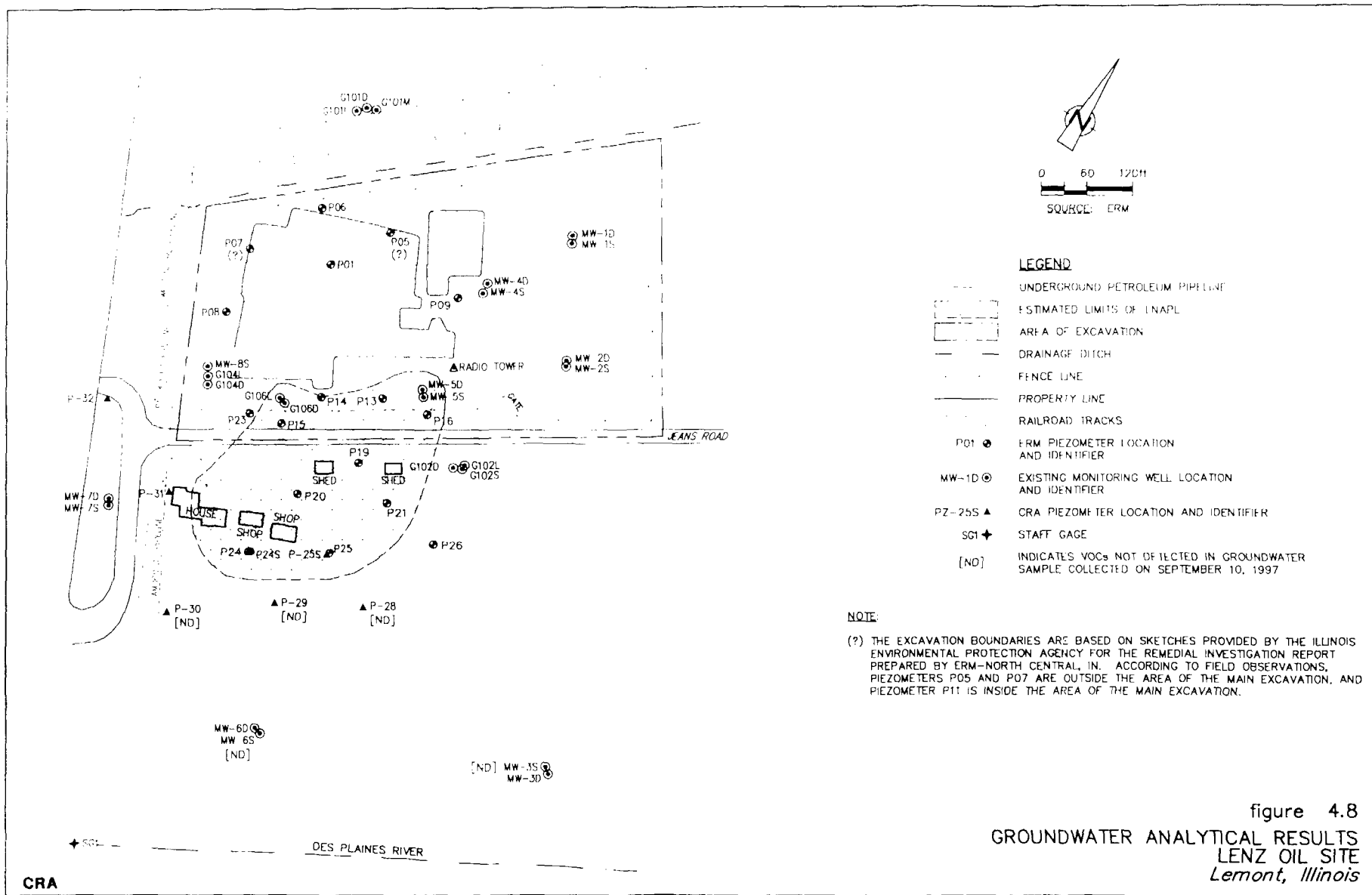


figure 4.8
GROUNDWATER ANALYTICAL RESULTS
LENZ OIL SITE
Lemont, Illinois

TABLES

TABLE 3.1
WATER LEVEL AND LNAPL MEASUREMENTS
JULY 31, 1997
LENZ OIL SITE
LEMONT, ILLINOIS

<i>Monitoring Location</i>	<i>Depth To LNAPL (feet btoc)</i>	<i>Depth to Groundwater (feet btoc)</i>	<i>Apparent LNAPL Thickness (feet)</i>
MW-5S	10.76	11.60	0.84
P14	ND	11.26	0.00
P19	13.09	16.33	3.24
P24S	ND	5.56	0.00
P25	7.44	8.08	0.64
P26	ND	7.48	0.00
William s Well	6.55	7.14	0.59

Notes:

btoc - below top of casing

ND - none detected

TABLE 3.2

WATER LEVEL AND LNAPL MEASUREMENTS
LENZ OIL SITE
LEMONT, ILLINOIS

Monitoring Location	Reference Elevation (feet AMSL) ¹	Total Depth (feet btoe) ²	AUGUST 7, 1997				SEPTEMBER 10, 1997				SEPTEMBER 23, 1997			
			Depth to Groundwater (feet btoe)	Depth To LNAPL (feet btoe)	Apparent LNAPL Thickness (feet)	Groundwater Elevation (feet AMSL)	Depth to Groundwater (feet btoe)	Depth To LNAPL (feet btoe)	Apparent LNAPL Thickness (feet)	Groundwater Elevation (feet AMSL)	Depth to Groundwater (feet btoe)	Depth To LNAPL (feet btoe)	Apparent LNAPL Thickness (feet)	Groundwater Elevation (feet AMSL)
MW-1S	602.88	20.90	8.76	ND ³	0.00	594.12	8.89	ND	0.00	593.99	8.91	ND	0.00	594.12
MW-1U	602.14	48.00	9.33	ND	0.00	592.81	9.25	ND	0.00	592.89	9.18	ND	0.00	592.81
MW-2S	603.23	14.80	9.79	ND	0.00	593.44	9.96	ND	0.00	593.27	9.94	ND	0.00	593.23
MW-2D	602.66	45.90	10.86	ND	0.00	591.80	10.62	ND	0.00	592.04	10.43	ND	0.00	591.80
MW-3S	597.99	21.30	7.35	ND	0.00	590.64	6.95	ND	0.00	591.04	6.61	ND	0.00	590.64
MW-3D	597.90	47.40	6.76	ND	0.00	591.14	6.54	ND	0.00	591.36	6.29	ND	0.00	591.14
MW-4S	603.35	21.60	8.68	ND	0.00	594.67	9.59	ND	0.00	593.76	9.45	ND	0.00	594.67
MW-4D	602.83	47.90	11.31	ND	0.00	591.52	11.05	ND	0.00	591.78	10.85	ND	0.00	591.52
MW-5S	603.92	NM ⁴	11.17	10.26	0.91	NA	11.20	10.51 ⁵	0.69	NA	11.08	10.36	0.72	NA
MW-5D	603.94	49.10	12.46	ND	0.00	591.48	12.22	ND	0.00	591.72	11.99	ND	0.00	591.48
MW-6S	594.04	16.50	2.73	ND	0.00	591.31	2.81	ND	0.00	591.23	2.38	ND	0.00	591.31
MW-6D	595.98	46.20	5.16	ND	0.00	590.82	4.88	ND	0.00	591.10	4.56	ND	0.00	590.82
MW-7S	608.29	34.80	17.30	TRACE	TRACE	NA	17.02	ND	0.00	591.27	16.74	ND	0.00	NA
MW-7D	608.01	57.20	16.92	ND	0.00	591.09	16.63	ND	0.00	591.38	16.36	ND	0.00	591.09
MW-8S	602.48	23.70	8.70	ND	0.00	593.78	8.64	ND	0.00	593.84	8.58	ND	0.00	593.78
G-101L	611.25	34.20	17.09	ND	0.00	594.16	17.17	ND	0.00	594.08	17.00	ND	0.00	594.16
G-101M	612.05	23.60	17.82	ND	0.00	594.23	17.92	ND	0.00	594.13	17.82	ND	0.00	594.23
G-101U	610.98	40.95	17.13	ND	0.00	593.85	17.09	ND	0.00	593.89	16.99	ND	0.00	593.85
G-102S	601.82	17.30	10.04	ND	0.00	591.78	10.04	ND	0.00	591.78	9.76	ND	0.00	591.78
G-102L	601.63	16.65	9.84	ND	0.00	591.79	9.85	ND	0.00	591.78	9.58	ND	0.00	591.79
G-102D	602.41	21.48	10.82	ND	0.00	591.59	10.81	ND	0.00	591.60	10.52	ND	0.00	591.59
G-104L	602.60	10.60	5.48	ND	0.00	597.12	8.24	ND	0.00	594.36	7.93	ND	0.00	597.12
G-104D	602.38	16.40	8.76	ND	0.00	593.62	8.69	ND	0.00	593.69	8.65	ND	0.00	593.62
G-106L	603.08	NM	12.56	10.11	2.45	NA	11.15	10.26 ⁵	0.89	NA	10.62	10.13	0.49	NA
G-106DR	603.31	47.35	12.02	ND	0.00	591.29	11.73	ND	0.00	591.58	11.47	ND	0.00	591.29
P01	603.03	NM	11.90	8.47	3.43	NA	11.93	8.65	3.28	NA	11.76	8.57	3.19	NA
P05	602.84	13.60	8.08	ND	0.00	594.76	8.73	ND	0.00	594.11	8.74	ND	0.00	594.76
P06	603.65	12.35	8.75	ND	0.00	594.90	9.39	ND	0.00	594.26	9.20	ND	0.00	594.90
P07	600.55	13.50	6.69	ND	0.00	593.86	6.78	ND	0.00	593.77	6.72	ND	0.00	593.86
P08	600.81	11.90	6.96	ND	0.00	593.85	7.05	ND	0.00	593.76	7.02	ND	0.00	593.85
P09	603.62	15.60	9.61	ND	0.00	594.01	9.81	ND	0.00	593.81	9.71	ND	0.00	594.01
P13	603.78	15.90	10.14	ND	0.00	593.64	10.46	TRACE	TRACE	NA	10.19	TRACE	TRACE	NA
P14	603.69	17.70	10.75	ND	0.00	592.94	10.89	ND	0.00	592.80	10.68	ND	0.00	592.94
P15	601.34	NM	9.42	9.38	0.04	NA	Could not locate piezometer			NA ⁶	9.26	9.24	0.02	NA

TABLE 3.2

WATER LEVEL AND LNAPL MEASUREMENTS
LENZ OIL SITE
LEMONT, ILLINOIS

Monitoring Location	Reference Elevation (feet AMSL) ¹	Total Depth (feet btoc) ²	Depth to Groundwater (feet btoc)	AUGUST 7, 1997			SEPTEMBER 10, 1997				SEPTEMBER 25, 1997				
				Depth To LNAPL (feet btoc)	Apparent LNAPL Thickness (feet)	Groundwater Elevation (feet AMSL)	Depth to Groundwater (feet btoc)	Depth To LNAPL (feet btoc)	Apparent LNAPL Thickness (feet)	Groundwater Elevation (feet AMSL)	Depth to Groundwater (feet btoc)	Depth To LNAPL (feet btoc)	Apparent LNAPL Thickness (feet)	Groundwater Elevation (feet AMSL)	
P16	604.20	21.30	11.53	TRACE	TRACE	NA	11.61	11.6	0.01	NA	11.39	TRACE	TRACE	599.71	
P19	604.18	NM	14.56	12.56	2.00	NA	16.55	12.07	4.48	NA	16.25	11.78	4.47	599.71	
P20	599.29	NM	12.31	7.44	4.87	NA	10.01	7.54	2.47	NA	10.64	7.09	3.55	599.71	
P21	601.03	NM	10.81	9.58	1.23	NA	12.28	9.25	3.03	NA	12.23	8.91	3.32	599.71	
P23	600.87	Could not locate piezometer				NA	Could not locate piezometer				NA	Could not locate piezometer			
P24	596.28	NM	6.45	5.13	1.32	NA	5.27	5.1 ⁷	0.17	NA	4.94	4.76	0.18	599.71	
P24S	596.18	12.80	4.75	TRACE	TRACE	NA	5.23	ND	0.00	590.95	4.81	ND	0.00	599.71	
P25	597.95/595.57 ⁸	NM	7.85	6.49	1.36	NA	5.31	5.03 ⁷	0.28	NA	4.84	4.57 ⁷	0.27	599.71	
P-25S	596.21	12.25	NI ⁹	NA	NA	NA	4.85	ND	0.00	591.36	4.49	ND	0.00	599.71	
P-26	598.23	20.50	6.68	ND	0.00	591.55	6.69	ND	0.00	591.54	6.39	ND	0.00	599.71	
P-28	595.57	12.28	NI ⁹	NA	NA	NA	4.33	ND	0.00	591.24	3.88	ND	0.00	599.71	
P-29	597.06	14.72	NI	NA	NA	NA	5.91	ND	0.00	591.15	5.56	ND	0.00	599.71	
P-30	598.81	15.32	NI	NA	NA	NA	7.61	ND	0.00	591.20	7.18	NI ⁹	0.00	599.71	
P-31	600.57	12.34	NI	NA	NA	NA	7.11	ND	0.00	593.46	6.82	ND	0.00	599.71	
P-32	605.17	20.20	NI	NA	NA	NA	10.83	ND	0.00	594.34	NM	ND	0.00	599.71	
SUJ-1	595.96	NA	NI	NA	NA	NA	NI	NA	NA	NA	4.86	ND	0.00	599.71	

¹ AMSL - Above Mean Sea Level² btoc - below top of casing³ ND - none detected⁴ NM - not measured⁵ Note LNAPL was bailed from wells on 9/8/97 during an attempted product recovery test⁶ NA - Not Available⁷ led out of piezometer on 9/8/97⁸ drilled to flush mount on 9/6/97⁹ NI - Not Installed

TABLE 3.3

SUMMARY OF PIEZOMETER CONSTRUCTION DETAILS
LENZ OIL SITE
LEMONT, ILLINOIS

<i>Well Number</i>	<i>Ground Surface Elevation (feet AMSL) ¹</i>	<i>Bottom of Boring</i>		<i>Screened Interval</i>		<i>Screened Interval</i>		<i>Formation Screened</i>	<i>Date Completed</i>
		<i>Depth</i>	<i>Elevation</i>	<i>From</i>	<i>To</i>	<i>From</i>	<i>To</i>		
		<i>(ft BGS) ²</i>	<i>(NGVD)</i>	<i>Depth</i>	<i>Depth</i>	<i>Depth</i>	<i>Depth</i>		
				<i>(ft BGS)</i>	<i>(ft BGS)</i>	<i>(NGVD)</i>	<i>(NGVD)</i>		
P-25S	596.5	13.0	583.5	2.5	12.5	594.0	584.0	Weathered Bedrock	09/05/97
P-28	595.8	13.0	582.8	2.5	12.5	593.3	583.3	Weathered Bedrock	09/05/97
P-29	593.8	13.0	580.8	2.5	12.5	591.3	581.3	Weathered Bedrock	09/05/97
P-30	595.9	13.0	582.9	2.5	12.5	593.4	583.4	Weathered Bedrock	09/04/97
P-31	600.8	13.0	587.8	2.5	12.5	598.3	588.3	Weathered Bedrock	09/05/97
P-32	601.7	15.0	586.7	5.0	15.0	596.7	586.7	Weathered Bedrock	09/04/97

1 AMSL - Above Mean Sea Level

2 ft BGS = Feet Below Ground Surface

TABLE 3.4
SUMMARY OF PIEZOMETER DEVELOPMENT PARAMETERS
LENZ OIL SITE
LEMONT, ILLINOIS

<i>Well Number</i>	<i>Date Conducted</i>	<i>Water Level feet btoc</i>	<i>Well Volume (gallons)</i>	<i>Volume Removed (gallons)</i>	<i>pH (Standard Units)</i>	<i>Conductivity (µhmos)</i>	<i>Temperature (°C)</i>	<i>Appearance</i>	<i>Development Method</i>
P-25S	9/8/97	4.78	1.2	5.0	Due to sheen on purged water, readings were not take				Bailed
P-28	9/5/97	6.77	1.3	4.0	7.70	1,231	15.5	cloudy, light gray	Bailed
				7.0	7.66	1,077	15.5	l. cloudy, light gra	Bailed
				9.0	7.46	1,035	15.3	l. cloudy, light gra	Bailed
				11.0	7.50	1,030	15.6	l. cloudy, light gra	Bailed
P-29	9/5/97	5.72	1.5	4.0	7.46	1,590	17.8	cloudy, gray	Bailed
				8.0	7.32	1,095	15.9	cloudy, gray	Bailed
				12.0	7.29	1,048	15.2	cloudy, gray	Bailed
				16.0	7.27	1,048	15.0	cloudy, gray	Bailed
				18.0	7.21	1,043	14.6	cloudy, gray	Bailed
P-30	9/8/97	7.41	1.2	4.0	7.04	1,890	17.0	cloudy, gray	Bailed
				8.0	7.34	1,560	16.1	cloudy, gray	Bailed
				9.5	7.16	1,560	15.8	cloudy, gray	Bailed
				11.0	7.07	1,205	15.8	cloudy, gray	Bailed
				12.5	7.05	1,252	15.9	cloudy, gray	Bailed
				14.0	7.05	1,248	15.8	cloudy, gray	Bailed
P-31	9/8/97	6.98	0.85	2.5	7.44	1,105	16.9	cloudy, gray	Bailed
				3.5	7.59	1,194	16.9	cloudy, gray	Bailed
				4.5	7.61	1,201	16.9	cloudy, gray	Bailed
				5.5	7.61	1,209	16.9	cloudy, gray	Bailed
P-32	9/5/97	12.46	1.2	2.0	7.28	6,050	15.1	sl. cloudy, gray	
Well purged dry at 4.0 gallons									

TABLE 3.4
SUMMARY OF PIEZOMETER DEVELOPMENT PARAMETERS
LENZ OIL SITE
LEMONT, ILLINOIS

<i>Well Number</i>	<i>Date Conducted</i>	<i>Water Level feet btoc</i>	<i>Well Volume (gallons)</i>	<i>Volume Removed (gallons)</i>	<i>pH (Standard Units)</i>	<i>Conductivity (µhmos)</i>	<i>Temperature (°C)</i>	<i>Appearance</i>	<i>Development Method</i>		
P-25S	9/8/97	4.78	1.2	5.0	Due to sheen on purged water, readings were not take				Bailed		
	9/6/97			5.5	7.10	6,950	14.7	sl. cloudy, gray			
				7.0	7.17	6,790	14.0	sl. cloudy, gray			
				8.5	7.18	6,810	14.1	sl. cloudy, gray			

TABLE 3.5
SUMMARY OF MONITORING WELL/PIEZOMETER PURGING PARAMETERS
LENZ OIL SITE
LEMONT, ILLINOIS

<i>Well Number</i>	<i>Date Conducted</i>	<i>Water Level (feet btoc)</i>	<i>Well Volume (gallons)</i>	<i>Volume Removed (gallons)</i>	<i>pH (standard units)</i>	<i>Conductivity (µmhos)</i>	<i>Temperature (°C)</i>	<i>Appearance</i>	<i>Purge Method</i>
MW-3S	09/10/97	6.95	2.4	3.0	6.90	1,129	14.4	sl. cloudy, sulfur odor, black debris	Bailed
				5.0	6.94	1,038	13.6	clear, sulfur odor, black debris	Bailed
				7.5	6.95	1,015	13.2	clear, sulfur odor, black debris	Bailed
				10.0	6.95	985	12.9	clear, no odor, less debris	Bailed
				12.5	6.95	978	12.9	clear, no odor, less debris	Bailed
MW-6S	09/10/97	2.81	2.2	2.5	7.10	713	14.7	cloudy, brown-gray, sulfur odor	Bailed
				5.0	7.11	711	14.7	cloudy, brown-gray, sulfur odor	Bailed
				7.5	7.12	707	14.6	cloudy, brown-gray, sl. odor	Bailed
				10.0	7.11	709	14.5	cloudy, brown-gray, sl. odor	Bailed
				12.5	7.13	702	14.3	cloudy, brown-gray, sl. odor	Bailed
				15.0	7.12	704	14.6	cloudy, brown-gray, sl. odor	Bailed
P-28	09/10/97	4.33	1.3	1.5	7.18	1,016	14.3	cloudy, milky white	Bailed
				3.0	7.23	1,030	13.9	cloudy, milky white	Bailed
				5.0	7.32	1,027	13.4	cloudy, milky white	Bailed
				6.5	7.27	920	13.9	cloudy, milky white	Bailed
				7.5	7.44	955	13.6	cloudy, milky white	Bailed
P-29	09/10/97	5.91	1.4	1.5	7.12	1,224	13.9	cloudy, gray, petroleum odor, sheen	Bailed
				3.0	7.12	1,189	13.5	cloudy, gray, petroleum odor, sheen	Bailed
				4.5	7.08	1,184	13.4	cloudy, gray, petroleum odor, sheen	Bailed
				6.0	7.04	1,112	12.9	cloudy, gray, petroleum odor, sheen	Bailed
				7.5	7.05	1,104	12.7	cloudy, gray, petroleum odor, sheen	Bailed
P-30	09/10/97	7.61	1.2	1.5	6.98	1,580	16.0	cloudy, brown-gray	Bailed
				3.0	7.02	1,293	15.6	cloudy, brown-gray	Bailed
				4.5	7.03	1,262	14.9	cloudy, brown-gray	Bailed
				6.0	7.07	1,266	14.5	cloudy, brown-gray	Bailed
				7.5	7.11	1,261	14.6	cloudy, brown-gray	Bailed

TABLE 4.1

**GROUNDWATER ELEVATION HISTORY
LENZ OIL SITE
LEMONT, ILLINOIS**

Well / Piezometer	Reference Elevation (feet AMSL ¹)	Groundwater Elevation (feet AMSL)																	
		1/9/91	2/26/91	3/20/91	4/24/91	5/9/91	6/24/91	7/30/91	8/27/91	9/27/91	10/30/91	11/21/91	12/23/91	1/28/92	2/19/92	3/19/92	8/19/94	8/26/94	9/2/94
G101M	612.05	594.53	595.75	595.90	596.74	595.84	594.50	592.71	592.15	591.89	594.15	594.25	594.55	594.00	594.10	594.60	593.54	593.13	593.72
MW-1S	602.88			595.96	596.70	595.74	591.60	590.16	590.00	589.96	593.36	594.55	594.53	594.00	594.20	594.57	593.56	592.96	592.54
MW-2S	603.23					595.31	593.55	591.81	591.30	591.11	596.13	594.42	594.21	593.00	594.09	594.16	592.92	592.33	592.56
MW-3S	597.99				592.84	591.48	589.64	588.93	588.80	588.87	593.30	592.15	591.35	590.00	591.33	591.34	589.59	588.16	589.21
MW-4S	603.35			596.34	596.29	595.41	593.86	592.08	591.58	591.42	596.81	594.46	594.23	594.00	593.95	594.22	593.39	592.73	592.64
MW-6S	594.04				593.36	592.44	590.11	589.24	589.11	589.21	593.72	592.22	592.11	591.00	591.53	591.72	590.55	589.56	589.41
MW-8S	602.48														593.79	594.25	593.27	592.78	592.42
P05	602.84																593.65	593.07	593.04
P06	603.65																594.16	593.50	593.42
P07	600.55																593.51	592.97	592.74
P08	600.81																593.53	593.02	592.94
P09	603.62																593.22	592.65	592.54
P14	603.69																592.27	591.66	591.54
P23	600.87																		
P24S	596.18																		
P26	598.23																		

¹ AMSL - Above mean sea level

TABLE 4.1

**GROUNDWATER ELEVATION HISTORY
LENZ OIL SITE
LEMONT, ILLINOIS**

	Reference Elevation	Groundwater Elevation (feet AMSL)													
Well/ Piezometer	(feet AMSL ¹)	9/9/94	9/16/94	9/23/94	9/30/94	10/7/94	10/25/94	11/1/94	11/8/94	8/7/97	9/10/97	MINIMUM	MAXIMUM	RANGE	
G101M	612.05	592.72	592.50	593.32	592.75	592.49	592.40	593.12	594.06	594.23	594.13	591.89	596.74	4.85	
MW-1S	602.88	592.43	592.51	592.03	592.32	592.06	591.88	593.16	594.24	594.12	593.99	589.96	596.70	6.74	
MW-2S	603.23	591.90	592.09	591.69	591.76	591.51	591.36	593.48	594.23	593.44	593.27	591.11	596.13	5.02	
MW-3S	597.99	589.04	588.87	589.03	589.11	588.87	588.98	591.88	592.29	590.64	591.04	588.16	592.29	4.13	
MW-4S	603.35	592.23	591.96	591.72	592.25	591.89	591.67	592.95	594.04	594.67	593.76	591.67	596.81	5.14	
MW-6S	594.04	589.07	589.29	589.37	589.56	589.29	589.43	592.36	592.51	591.31	591.23	589.07	593.72	1.65	
MW-8S	602.48	592.56	592.20	592.23	592.56	592.17	591.98	592.80	593.73	593.78	593.84	591.98	593.84	1.86	
P05	602.84	592.63	592.24	593.33	592.71	591.38	592.14	593.29	594.31	594.76	594.11	591.38	594.76	3.38	
P06	603.65	592.84	592.50	592.31	592.80	592.44	592.26	592.89	594.81	594.90	594.26	592.26	594.90	2.64	
P07	600.55	Dry	592.16	592.18	592.61	592.29	592.08	592.98	593.96	593.86	593.77	592.08	593.96	1.88	
P08	600.81	592.55	592.14	592.16	592.74	592.29	592.09	593.79	594.19	593.85	593.76	592.09	594.19	2.10	
P09	603.62	592.22	591.81	591.73	592.19	591.86	591.68	592.77	594.10	594.01	593.81	591.68	594.10	2.42	
P14	603.69	591.29	591.00	590.94	591.39	591.05	590.87	592.90	593.58	592.94	592.80	590.87	593.58	2.71	
P23	600.87		590.47	590.50	590.79	590.52	590.39	591.30	592.95	NS	NS	590.39	592.95	2.56	
P24S	596.18						589.28	592.12	592.44	596.12	595.64	589.28	596.12	6.84	
P26	598.23		589.52	589.62	589.80	589.54	589.48	592.33	592.91	591.55	591.54	589.48	592.91	3.43	
												Minimum	588.16	592.29	1.86
												Maximum	592.26	596.81	6.84
												Arithmetic M	590.83	594.61	3.77
												Geometric M	590.83	594.60	3.46

¹ AMSL - Above mean sea level

¹ AMSL - Above mean sea level

TABLE 4.2

SUMMARY OF VOCs DETECTED IN INAPL SAMPLES
LENZ OIL SITE
LEMONT, ILLINOIS

<i>Analyte</i>	<i>Residential Well</i>	<i>Concentration $\mu\text{g/kg}$¹</i>		<i>Comment</i>
		<i>MW-5S</i>	<i>P19</i> ¹	
Chloroethane	ND ²	ND	23,000	
Acetone	5,800	ND	ND	
1,1-Dichloroethene	ND	ND	4,200	
1,1-Dichloroethane	ND	ND	120,000	E ³
cis-1,2-Dichloroethene	ND	ND	320,000	E
1,1,1-Trichloroethane	ND	ND	170,000	E
1,2-Dichloropropane	ND	ND	5,500	
Benzene	ND	ND	240,000	E
Tetrachloroethene	ND	ND	8,400	
Toluene	ND	ND	3,700,000	
Chlorobenzene	ND	ND	11,000	
Ethylbenzene	ND	6,900	1,400,000	
Xylenes	4,700	29,000	6,400,000	
Total VOCs $\mu\text{g/kg}$	10,500	35,900	12,402,100	

¹ $\mu\text{g/kg}$ = micrograms per kilogram

² ND = Not detected

³ E = Indicates that it exceeds calibration curve range.

TABLE 4.3

SUMMARY OF VOCs DETECTED IN SOIL SAMPLES
LENZ OIL SITE
LEMONT, ILLINOIS

<i>Sample Location</i>	<i>BH-2</i>	<i>BH-8</i>
<i>Sample Interval</i>	<i>4-6 feet bgs¹</i>	<i>2-4 feet bgs</i>
<i>Analyte</i>	<i>Detected Concentration $\mu\text{g}/\text{kg}$²</i>	
Benzene	34 J ³	ND(5) ⁴
Trichloroethene	ND(5) UJ ⁵	6
Tetrachloroethene	6 J	ND(5)
Ethylbenzene	32 J	ND(5)
Xylenes, total	160 J	18
Acetone	27 J	20

¹ bgs - below ground surface

² $\mu\text{g}/\text{kg}$ - micrograms per kilogram

³ J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

⁴ ND(5) - Compound not detected at concentration greater than the detection limit shown in parentheses

⁵ UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

TABLE 4.4

SUMMARY OF LNAPL RECOVERY TEST RESULTS
LENZ OIL SITE
LEMONT, ILLINOIS

<i>Monitoring Well/ Piezometer</i>	<i>Apparent LNAPL Interval Before Test</i>		<i>Apparent LNAPL Thickness Before Test (feet)</i>	<i>Calculated¹ LNAPL Thickness (feet)</i>	<i>Capillary Fringe Thickness (feet)</i>
	<i>From</i>	<i>To</i>			
	<i>(feet btoc)</i>	<i>(feet btoc)</i>			
P20	7.09	12.97	5.88	0.2	5.68
G106L	9.92	12.52	2.6	0.16	2.44
P19	12.07	16.55	4.48	1.6	2.88

¹ Using method after Graszczenski (1987)

APPENDICES

APPENDIX A

WATER WELL SEALING FORM

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH
525 WEST JEFFERSON STREET
SPRINGFIELD, ILLINOIS 62761

RETURN ALL COPIES TO IDPH OR
LOCAL HEALTH DEPARTMENT

TYPE OR PRESS FIRMLY

This form shall be submitted to this Department or the local health department not more than 30 days after a water well, boring or monitoring well is sealed. Such wells are to be sealed not more than 30 days after they are abandoned in accordance with the sealing requirements in the Water Well Construction Code.

1. Ownership (Name of Controlling Party) Pete Taneling (8 S. 365 Madison Street, Hinsdale IL)
2. Well Location: R.R-2 and Jeans Rd. Lemont Cook
Address - Lot Number City County

General Description: Township 37 (N)(S) Range 11 (E)(W) Section 11
SE Quarter of the NW Quarter of the SE Quarter

3. Year Drilled unknown
4. Drilling Permit Number (and date, if known) unknown
5. Type of Well: Bored _____ Drilled X Other _____
6. Total Depth 92.0' Diameter(inches) 5" steel
7. Formation clear of obstruction X Yes _____ No _____

8. DETAILS OF PLUGGING

Filled with Pea Gravel from 92.0' to 45.0 ft.
(cement or other materials)

Kind of plug Bentonite Chips from 45.0' to 5.0 ft.

Filled with Concrete from 5.0 to 6.5 ft.

Kind of plug _____ from _____ to _____ ft.

Filled with _____ from _____ to _____ ft.

Kind of plug _____ from _____ to _____ ft.

9. CASING RECORD: Upper 3 feet of casing removed _____ Yes X No
10. Date well was sealed: Month August Day 7TH Year 1997.

11. Licensed water well driller or other person approved by the Department performing well sealing.

Fox Exploration Inc
Name

N/A
Complete License Number

500 Park Blvd, Suite 1212
Address

Itasca
City

IL 60143
State/Zip

B

APPENDIX B

SOIL BORING STRATIGRAPHIC LOGS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(CL-01)
Page 1 of 1

PROJECT NAME: LENZ OIL SITE
PROJECT NUMBER: 6711
CLIENT: LENZ OIL PRP GROUP
LOCATION: Lemont, Illinois

HOLE DESIGNATION: BH-1
DATE COMPLETED: SEPTEMBER 02, 1997
DRILLING METHOD: 3 3/4" HSA
CRA SUPERVISOR: W. Pochron

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	GROUND SURFACE	595.8					
	(FILL) (CL)-CLAY, silt trace of gravel, stiff, brown, slightly moist			1SS	X	8	8.2
-2.5	- saturated	593.3		2SS	X	2	65.2
-5.0	(CL)-CLAY, some silt, trace of gravel, soft, brown to black, saturated slight petroleum odor - thin 3 inch sand seam, no odor			3SS	X	5	1.6
-7.5		587.8		4SS	X	2	3.5
-10.0	(ML)SILT, trace of gravel and sand size grains, hard gray, possibly weathered bedrock (dolomite) rock fragment at base of the spoon END OF BOREHOLE SPLIT SPOON REFUSAL AT 9.0ft.	586.8		5SS	X	>50	1.2
-12.5							
-15.0							
-17.5							
-20.0							
-22.5							
-25.0							
-27.5							
-30.0							
-32.5							


NOTES: MEASURING POINT ELEVATIONS MAY CHANGE: REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(CL-02)
Page 1 of 1

PROJECT NAME: LENZ OIL SITE
PROJECT NUMBER: 6711
CLIENT: LENZ OIL PRP GROUP
LOCATION: Lemont, Illinois

HOLE DESIGNATION: BH-2
DATE COMPLETED: SEPTEMBER 02, 1997
DRILLING METHOD: 3 3/4" HSA
CRA SUPERVISOR: W. Pochron

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	GROUND SURFACE	598.0					
-2.5	(FILL) (CL)CLAY, some silt trace of gravel, very stiff, brown, slightly moist - brick - Asphalt and rubble	592.0	 <div style="position: absolute; left: 698px; top: 338px;">BENTONITE CHIPS</div> <div style="position: absolute; left: 698px; top: 393px;">8" Ø BOREHOLE</div>	1SS	X	32	0
				2SS	X	32	240
-5.0	(CL)CLAY, little silt, trace of gravel, stiff, brown to gray (mottled), wet - stained soil black petroleum odor.	589.5		3SS	X	0	354
-7.5	(ML)-SILT, little gravel and trace of sand size graines, very stiff, saturated gray, possibly weathered bedrock.	586.0		4SS	X	24	803
-10.0	- END OF BOREHOLE AT 10.0ft.	586.0		5SS	X	36	112
-12.5							
-15.0							
-17.5							
-20.0							
-22.5							
-25.0							
-27.5							
-30.0							
-32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ☒ STATIC WATER LEVEL ☒
CHEMICAL ANALYSIS ☐

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(CL-00)
Page 1 of 1

PROJECT NAME: LENZ OIL SITE
PROJECT NUMBER: 6711
CLIENT: LENZ OIL PRP GROUP
LOCATION: Lemont, Illinois

HOLE DESIGNATION: BH-3
DATE COMPLETED: SEPTEMBER 02, 1997
DRILLING METHOD: 3 3/4" HSA
CRA SUPERVISOR: W. Pachron

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	GROUND SURFACE	597.8					
	(FILL) (CL)-CLAY, some silt, little gravel, very stiff, brown dry, little gravel and rubble			1SS	X	37	10.2
-2.5	(SP)-SAND, little gravel trace of silt, dense, poorly graded, tan to gray, wet, sand is fine grained with little medium to coarse grains	595.8		2SS	X	43	0
-5.0	- sand becomes saturated			3SS	X	23	35.0
-7.5	(SW)-SAND, some gravel (angular dolomite) fine and coarse graind, trace of silt extremely dense, saturated, gray to tan, weathered bedrock	590.6		4SS	X	35	54.8
-10.0	END OF BOREHOLE AT 10.0ft	587.6		5SS	X	85	10.2
-12.5							
-15.0							
-17.5							
-20.0							
-22.5							
-25.0							
-27.5							
-30.0							
-32.5							


NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ○

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(DL-001)
Page 1 of 1

PROJECT NAME: LENZ OIL SITE
PROJECT NUMBER: 6711
CLIENT: LENZ OIL PRP GROUP
LOCATION: Lemont, Illinois

HOLE DESIGNATION: BH-4
DATE COMPLETED: SEPTEMBER 03, 1997
DRILLING METHOD: 3 3/4" HSA
CRA SUPERVISOR: W. Pochron

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	GROUND SURFACE	599.9					
2.5	(FILL) (CL)-CLAY, some silt, trace of gravel, stiff, brown, slightly moist	596.9		1SS	X	12	0
	(ML)-SILT, little clay, trace of gravel and roots, very stiff, brown, moist	595.6		2SS	X	23	202
5.0	(SP)-SAND, fine grained, little medium and trace of coarse grains, medium dense, tan, saturated	593.7		3SS	X	21	305
7.5	(ML)-SILT, some gravel (angular dolomite), little sand size grains, hard, moist, light brown to gray	591.4		4SS	X	>50	21.3
	END OF BOREHOLE AT 8.5ft			5SS	X	>50	-
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ○

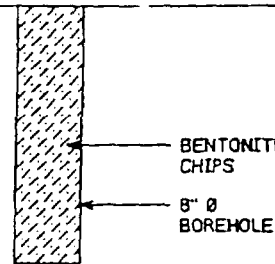
STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

TCL-051
Page 1 of 1

PROJECT NAME: LENZ OIL SITE
PROJECT NUMBER: 6711
CLIENT: LENZ OIL PRP GROUP
LOCATION: Lemont, Illinois

HOLE DESIGNATION: BH-5
DATE COMPLETED: SEPTEMBER 03, 1997
DRILLING METHOD: 3 3/4" HSA
CRA SUPERVISOR: W. Pochron

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	P10 (ppm)
	GROUND SURFACE	801.5					
	TOP SOIL AND VEGETATION	801.0					
	(ML)-SILT, little gravel, trace of clay, brown, moist	801.0		1SS	X	-	0
-2.5	(ML)-SILT, some gravel, trace of sand size grains, tan to gray, moist, (weathered bedrock)	599.0		2SS	X	-	3.0
-5.0				3SS	X	-	7.4
-7.5	END OF BOREHOLE AT 6.5ft.	595.0		3SS	X	-	-
-10.0							
-12.5							
-15.0							
-17.5							
-20.0							
-22.5							
-25.0							
-27.5							
-30.0							
-32.5							



NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ○

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

MCL-0
Page 1 of 1

PROJECT NAME: LENZ OIL SITE
PROJECT NUMBER: 6711
CLIENT: LENZ OIL PRP GROUP
LOCATION: Lemont, Illinois

HOLE DESIGNATION: BH-7
DATE COMPLETED: SEPTEMBER 03, 1997
DRILLING METHOD: 3 3/4" HSA
CRA SUPERVISOR: W. Pochran

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	"N" VALUE	PTD (ppm)
	GROUND SURFACE	601.0					
	SILT AND GRAVEL	600.7					
	(ML)-SILT, little gravel trace of sand, firm brown, moist	600.0		1SS	X	8	0
-2.5	(SP)-SAND, fine grained, little gravel, medium dense, tan, moist	599.0		2SS	X	40	14.7
-5.0	(ML)-SILT, some gravel, (angular dolomite), little sand size grains, hard, gray to tan, moist	596.5		3SS	X	-	8.4
	END OF BOREHOLE AT 4.5ft			4SS	X	-	
-7.5							
-10.0							
-12.5							
-15.0							
-17.5							
-20.0							
-22.5							
-25.0							
-27.5							
-30.0							
-32.5							


NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ○

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(CL 50)
Page 1 of 1

PROJECT NAME: LENZ OIL SITE
PROJECT NUMBER: 6711
CLIENT: LENZ OIL PRP GROUP
LOCATION: Lemont, Illinois

HOLE DESIGNATION: BH-8
DATE COMPLETED: SEPTEMBER 03, 1997
DRILLING METHOD: 3 3/4" HSA
CRA SUPERVISOR: W. Pochron

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	"N" VALUE	PTD (ppm)
	GROUND SURFACE	600.1					
2.5	(FILL)-SILT, sand and gravel (ML)-SILT, little gravel, trace of sand and clay, firm, brown, moist	597.8		ISS	X	8	1.4
5.0	(ML)-SILT, some gravel, (angular dolomite), little sand size grains, hard, gasoline odor (weathered bedrock), gray to tan, moist - becomes saturated	594.1		2SS	X	38	65.4
	- END OF BOREHOLE AT 6.0ft			3SS	X	>50	13.7
7.5							
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							


NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ○

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

BH-00
Page 1 of 1

PROJECT NAME: LENZ OIL SITE
PROJECT NUMBER: 6711
CLIENT: LENZ OIL PRP GROUP
LOCATION: Lemont, Illinois

HOLE DESIGNATION: BH-9
DATE COMPLETED: SEPTEMBER 03, 1997
DRILLING METHOD: 3 3/4" HSA
CRA SUPERVISOR: W. Pochron

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	"N" VALUE	PID (ppm)
	GROUND SURFACE	599.3					
2.5	(ML)-SILT, little gravel and clay, stiff dark brown to black, moist		 <p>BENTONITE CHIPS 8" Ø BOREHOLE</p>	1SS	X	>50	a
5.0	(ML)-SILT, some gravel, (angular dolomite), little sand size grains, (weathered bedrock), gray to tan, moist	595.5		2SS	X	28	a
	- saturated	593.3		3SS	X	33	a
	END OF BOREHOLE AT 6.0ft						
7.5							
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ○

C

APPENDIX C

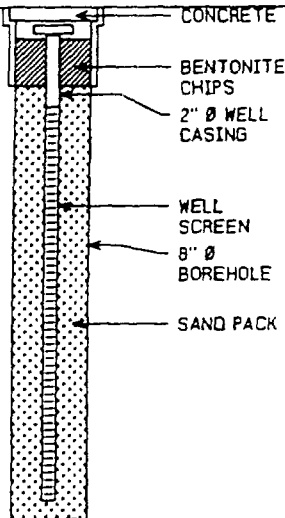
PIEZOMETER STRATIGRAPHIC AND INSTRUMENTATION LOGS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(CL-10)
Page 1 of 1

PROJECT NAME: LENZ OIL SITE
PROJECT NUMBER: 6711
CLIENT: LENZ OIL PRP GROUP
LOCATION: Lemont, Illinois

HOLE DESIGNATION: P-25S
DATE COMPLETED: SEPTEMBER 5, 1997
DRILLING METHOD: 4 1/4" HSA
CRA SUPERVISOR: W. Pochron

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	GROUND SURFACE REFERENCE POINT (Top of Riser)	596.5 596.21					
2.5	FOR STRATIGRAPHY DETAILS REFER TO THE STRATIGRAPHIC LOG FOR P-25		 <p>CONCRETE BENTONITE CHIPS 2" Ø WELL CASING WELL SCREEN 8" Ø BOREHOLE SAND PACK</p>				
5.0							
7.5							
10.0							
12.5							
13.0	END OF HOLE @ 13.0ft BGS	583.5	<p>SCREEN DETAILS Screened Interval: 2.5 to 12.5ft BGS Length: 10.0ft Diameter: 2" Slot Size: #10 Material: Stainless Steel Sand Pack: 2.5 to 13.0ft BGS Material: #5 Silica Sand</p>				
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

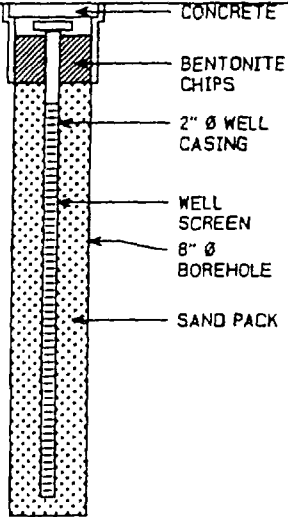
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(CL-11)
Page 1 of 1

PROJECT NAME: LENZ OIL SITE
PROJECT NUMBER: 6711
CLIENT: LENZ OIL PRP GROUP
LOCATION: Lemont, Illinois

HOLE DESIGNATION: P-28
DATE COMPLETED: SEPTEMBER 5, 1997
DRILLING METHOD: 4 1/4" HSA
CRA SUPERVISOR: W. Pochron

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	GROUND SURFACE REFERENCE POINT (Top of Riser)	595.8 595.57					
2.5	TOP SOIL AND VEGETATION (CL)-CLAY, little silt and gravel, firm, brown, moist	595.4	 <p>CONCRETE BENTONITE CHIPS 2" Ø WELL CASING WELL SCREEN 8" Ø BOREHOLE SAND PACK</p>	1SS	X	7	0.8
5.0	(ML)-SILT, some gravel (angular dolomite), little sand size grains, hard, tan to gray, weathered bedrock	592.0		2SS	X	15	0
7.5				3SS	X	>50	-
10.0							
12.5	END OF HOLE @ 13.0ft BGS	582.8					
15.0			<p><u>SCREEN DETAILS</u> Screened Interval: 2.5 to 12.5ft BGS Length: 10.0ft Diameter: 2" Slot Size: #10 Material: Stainless Steel Sand Pack: 2.5 to 13.0ft BGS Material: #5 Silica Sand</p>				
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

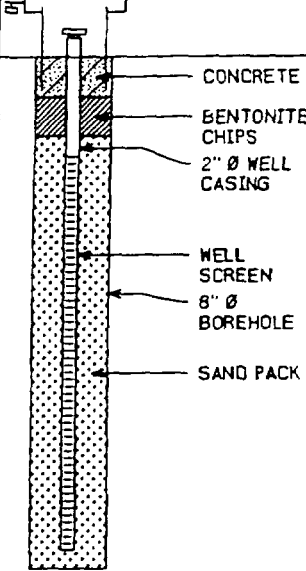
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(CL-12)
Page 1 of 1

PROJECT NAME: LENZ OIL SITE
PROJECT NUMBER: 6711
CLIENT: LENZ OIL PRP GROUP
LOCATION: Lemont, Illinois

HOLE DESIGNATION: P-29
DATE COMPLETED: SEPTEMBER 5, 1997
DRILLING METHOD: 4 1/4" HSA
CRA SUPERVISOR: W. Pochron

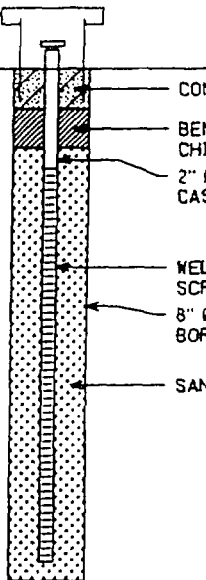
DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	REFERENCE POINT (Top of Riser) GROUND SURFACE	597.08 593.8	 <p>CONCRETE BENTONITE CHIPS 2" Ø WELL CASING WELL SCREEN 8" Ø BOREHOLE SAND PACK</p>				
2.5	FILL (ML)-SILT, little clay, gravel and cobbles, brownish gray, dry	592.3				-	-
	(ML)-SILT, little gravel, trace of clay, stiff, brown, moist			ISS		g	-
5.0	(ML)-SILT, some gravel (angular dolomite), little sand size grains, hard, saturated tan to gray, (weathered bedrock)	589.8					
7.5							
10.0							
12.5							
	END OF HOLE @ 13.0ft BGS	580.8					
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

SCREEN DETAILS
Screened Interval:
2.5 to 12.5ft BGS
Length: 10.0ft
Diameter: 2"
Slot Size: #10
Material: Stainless Steel
Sand Pack:
2.5 to 13.0ft BGS
Material: #5 Silica Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND √ STATIC WATER LEVEL √

(CL-13)
Page 1 of 1

HOLE DESIGNATION: P-30
DATE COMPLETED: SEPTEMBER 4, 1997
DRILLING METHOD: 4 1/4" HSA
CRA SUPERVISOR: W. Pochron

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	FID (ppm)
	REFERENCE POINT (Top of Riser) GROUND SURFACE	598.81 595.9					
-2.5	FOR STRATIGRAPHIC DETAILS REFER TO THE STRATIGRAPHIC LOG FOR 3H-1						
-5.0							
-7.5							
-10.0							
-12.5							
-15.0	END OF HOLE @ 13.0ft BGS	582.9	<p><u>SCREEN DETAILS</u> Screened Interval: 2.5 to 12.5ft BGS Length: 10.0ft Diameter: 2" Slot Size: #10 Material: Stainless Steel Sand Pack: 2.5 to 13.0ft BGS Material: #5 Silica Sand</p>				
-17.5							
-20.0							
-22.5							
-25.0							
-27.5							
-30.0							
-32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

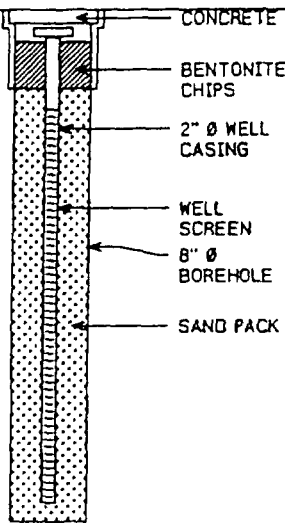
WATER FOUND ▼ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(CL-14)
Page 1 of 1

PROJECT NAME: LENZ OIL SITE
PROJECT NUMBER: 6711
CLIENT: LENZ OIL PRP GROUP
LOCATION: Lemont, Illinois

HOLE DESIGNATION: P-31
DATE COMPLETED: SEPTEMBER 5, 1997
DRILLING METHOD: 4 1/4" HSA
CRA SUPERVISOR: W. Pochron

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	P10 (ppm)
	GROUND SURFACE REFERENCE POINT (Top of Riser)	800.8 800.57					
2.5	TOP SOIL AND VEGETATION (ML)-SILT, little gravel and sand, stiff, brown, moist	800.4		1SS	X	8	0
				2SS	X	10	0.8
5.0	(ML)-SILT, some gravel (angular dolomite) and little sand size grains, hard, gray to tan, wet, (weathered bedrock) - saturated	596.5		3SS	X	45	1.6
7.5				4SS	X	>50	0.7
10.0				5SS	X	>50	N/A
12.5	END OF HOLE @ 13.01t BGS	587.8					
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

SCREEN DETAILS
Screened Interval:
2.5 to 12.5ft BGS
Length: 10.0ft
Diameter: 2"
Slot Size: #10
Material: Stainless Steel
Sand Pack:
2.5 to 13.01t BGS
Material: #5 Silica Sand

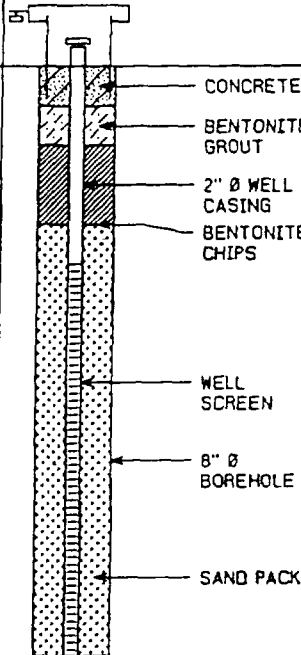
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ↓ STATIC WATER LEVEL ↓

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(CL-10)
Page 1 of 1

PROJECT NAME: LENZ OIL SITE
PROJECT NUMBER: 6711
CLIENT: LENZ OIL PRP GROUP
LOCATION: Lemont, Illinois

HOLE DESIGNATION: P-32
DATE COMPLETED: SEPTEMBER 4, 1997
DRILLING METHOD: 4 1/4" HSA
CRA SUPERVISOR: W. Pochron

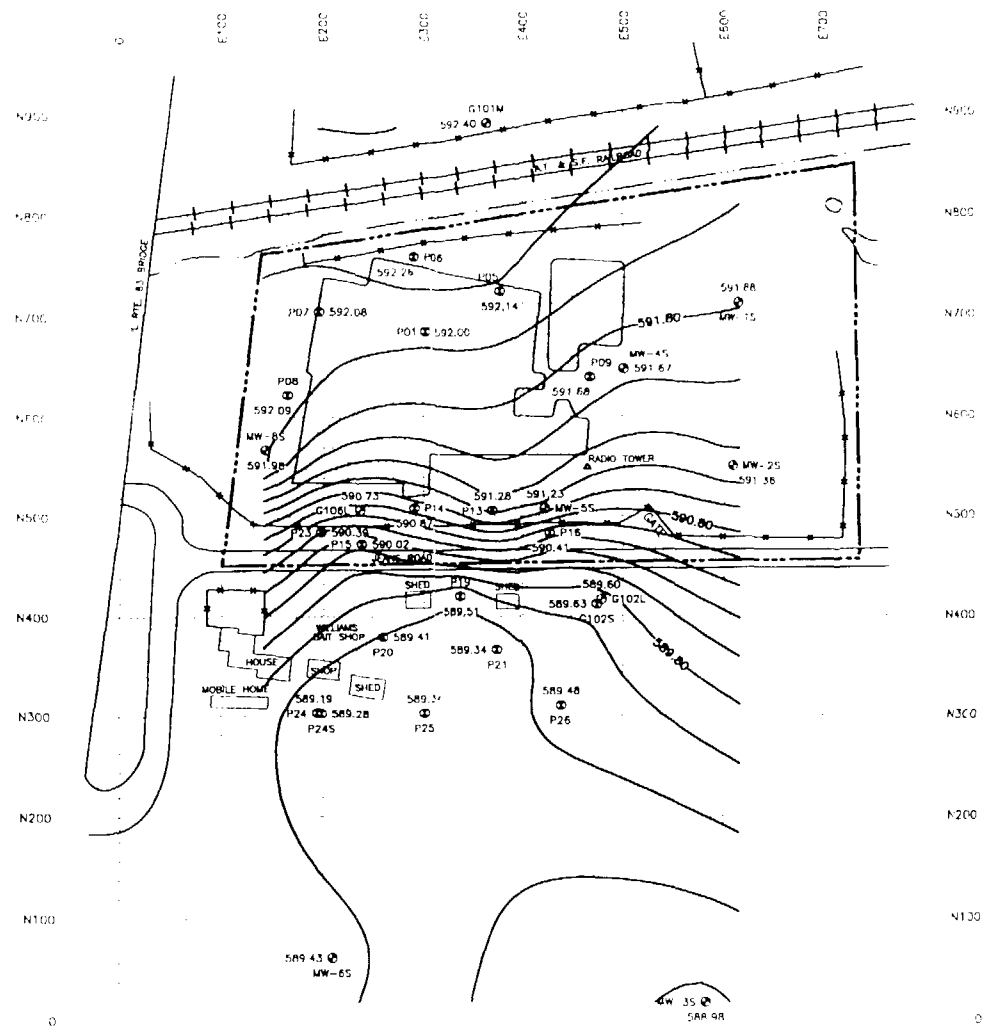
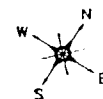
DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE				
				NUMBER	STATE	'N' VALUE	PID (ppm)	
	REFERENCE POINT (Top of Riser) GROUND SURFACE	605.17 601.7						
-2.5	(FILL) (ML)-SILT, little gravel, and clay trace of sand, stiff, slightly moist, brown	598.5		CONCRETE	1SS	X	0	7.3
				BENTONITE GROUT		X		
-5.0	(ML)-SILT, some gravel (angular dolomite), little sand size grains, hard slightly moist, tan gray, (weathered bedrock)			2" Ø WELL CASING	2SS	X	37	0
				BENTONITE CHIPS	3SS	X	38	0
-7.5				4SS	X	>50	0	
-10.0			WELL SCREEN					
-12.5			8" Ø BOREHOLE					
-15.0	END OF HOLE @ 15.0ft BGS	586.7	SAND PACK					
-17.5			<u>SCREEN DETAILS</u> Screened Interval: 5 to 15ft BGS Length: 10.0ft Diameter: 2" Slot Size: #10 Material: Stainless Steel Sand Pack: 4 to 15.0ft BGS Material: #5 Silica Sand					
-20.0								
-22.5								
-25.0								
-27.5								
-30.0								
-32.5								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼

D

APPENDIX D

ERM'S GROUNDWATER CONTOUR MAPS (ILLUSTRATING HIGH AND LOW WATER TABLE CONDITIONS)



APPROX. SCALE (ft.)
0 120

SYMBOL LEGEND

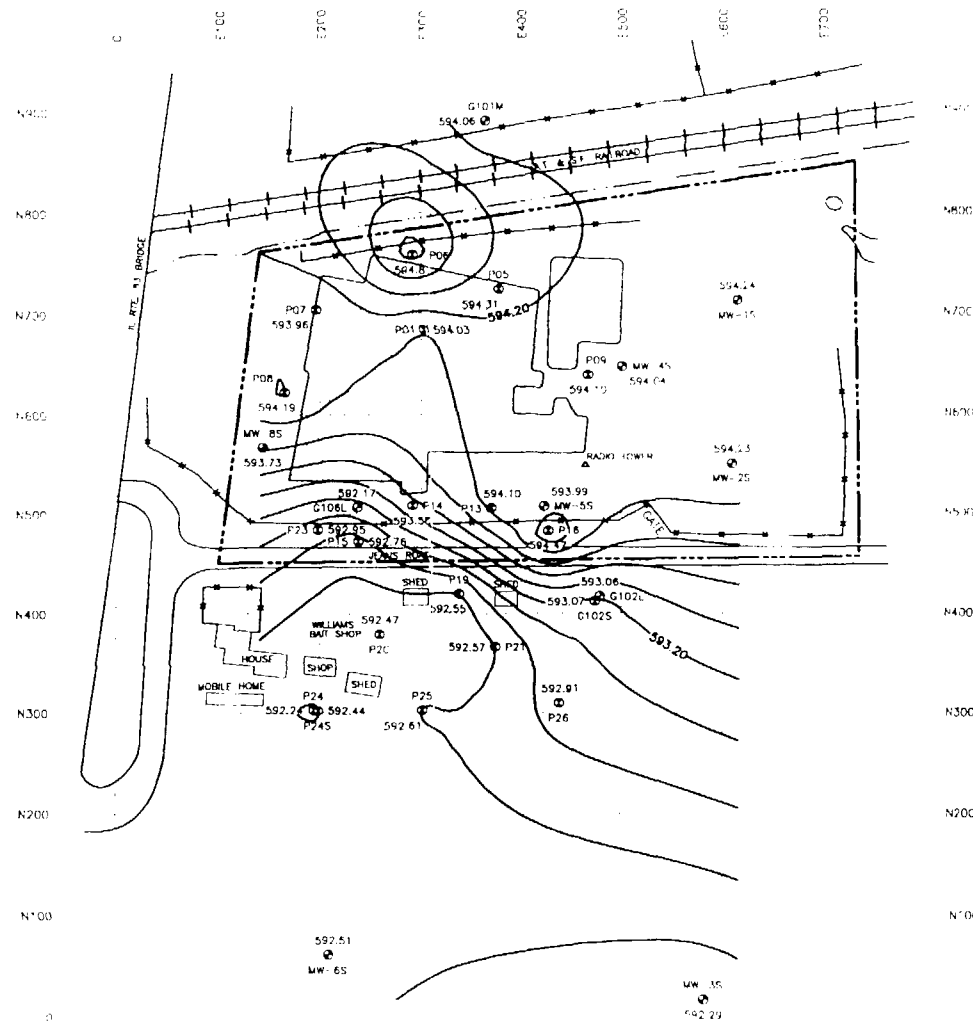
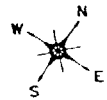
- AREA OF EXCAVATION
- DRAINAGE DITCH
- PROPERTY LINE
- FENCE LINE
- RAILROAD
- CONTOUR LINE
- SPRING IN WHICH NO PIEZOMETER WAS INSTALLED
- PIEZOMETER LOCATION
- MONITORING WELL LOCATION
- GROUND WATER ELEVATION

NOTES:

THE EXCAVATION BOUNDARIES ARE BASED ON SKETCHES PROVIDED BY THE LENOIR ENVIRONMENTAL PROTECTION AGENCY FOR THE REMEDIAL INVESTIGATION REPORT PREPARED BY LRM-NORTH CENTRAL, INC. ACCORDING TO FIELD OBSERVATIONS, PIEZOMETERS P05 AND P07 ARE OUTSIDE THE AREA OF THE MAIN EXCAVATION, AND PIEZOMETER P11 IS INSIDE THE AREA OF THE MAIN EXCAVATION. ALL ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL.

FIGURE F-9
PIEZOMETRIC SURFACE ELEVATION
SHALLOW WELLS/PIEZOMETERS
OCTOBER 25, 1994
LENZ OIL SITE
LEMONT, ILLINOIS





APPROX. SCALE (ft.)
0 120

SYMBOL LEGEND

- AREA OF EXCAVATION
- DRAINAGE DITCH
- PROPERTY LINE
- FENCE LINE
- RAILROAD
- 591.0 CONTOUR LINE
- BORING IN WHICH NO PIEZOMETER WAS INSTALLED
- PIEZOMETER LOCATION
- MONITORING WELL LOCATION
- GROUND WATER ELEVATION

NOTES

THE EXCAVATION BOUNDARIES ARE BASED ON SKETCHES PROVIDED BY THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY FOR THE REMEDIAL INVESTIGATION REPORT PREPARED BY ERM-NORTH CENTRAL, INC. ACCORDING TO FIELD OBSERVATIONS. PIEZOMETERS P05 AND P07 ARE OUTSIDE THE AREA OF THE MAIN EXCAVATION, AND PIEZOMETER P11 IS INSIDE THE AREA OF THE MAIN EXCAVATION. ALL ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL.

FIGURE F-11
PIEZOMETRIC SURFACE ELEVATION
SHALLOW WELLS/PIEZOMETERS
NOVEMBER 8, 1994
LENZ OIL SITE
LEMONT, ILLINOIS



APPENDIX E

TORKELSON ANALYTICAL REPORT

GW/S ENVIRONMENTAL CONSULTING



GENE W. SCHMIDT, CGWP & PHG
Specializing in Hydrocarbon Contamination of
Ground Water and Soils

4372 E. 57th Street
Tulsa, OK 74135-4238

(H) 918-496-3859
(O) 918-660-3424

Rec'd CRA
SEP 16 1997

August 12, 1997

972240001-TUL

Ron Frehner
CRA
1801 Old Highway 8, Suite 114
St. Paul, MN 55112

Subject: Lenz Oil Site

The gas chromatograms (GC) and accompanying data and results of the four product (liquid hydrocarbon) samples collected on August 7, 1997, are attached.

Sample WP-001 is composed of approximately 65% diesel and 34% motor oil. Sample WP-002 is composed of about 62% diesel and 38% motor oil. Both of these samples are from the same diesel and motor oil source and the diesel has been in the subsurface approximately 7 years (± 2 years) as calculated from the Schmidt (1997) modification/validation of the Christensen and Larsen plot (1993).

The WP-003 sample is composed of approximately 3% highly degraded gasoline, 44% very highly degraded (weathered) diesel and about 53% motor oil. The diesel has been released to the subsurface about 20 plus years ago.

Sample WP-004 is composed of about 12% gasoline (not too degraded), about 42% diesel, which is a different diesel from the type in WP-001 and WP-002. The diesel in this sample is very "fresh" with a release date of approximately 2 years or less ago (± 2 years). The remainder of sample WP-004 is composed of approximately 46% motor oil.

If you need any additional information, please call.

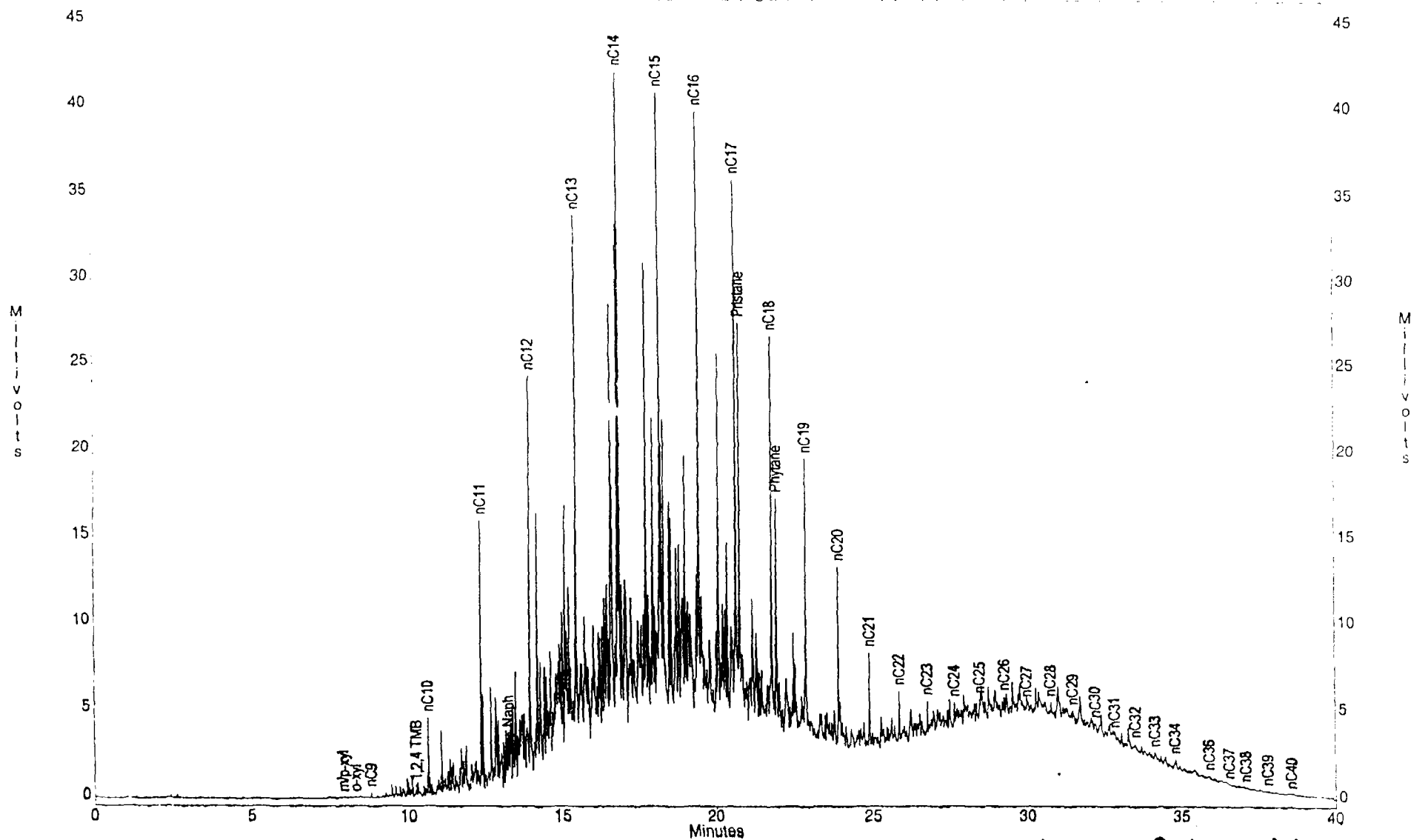
Gene W. Schmidt

Gene W. Schmidt

GWS:jdy
Attachments

Lenz Oil Site
 Sample ID : L-080797-WP-001
 Acquired : Aug 9, 1997

c:\ezchrom\chrom\97065\blwp-001 -- Channel A



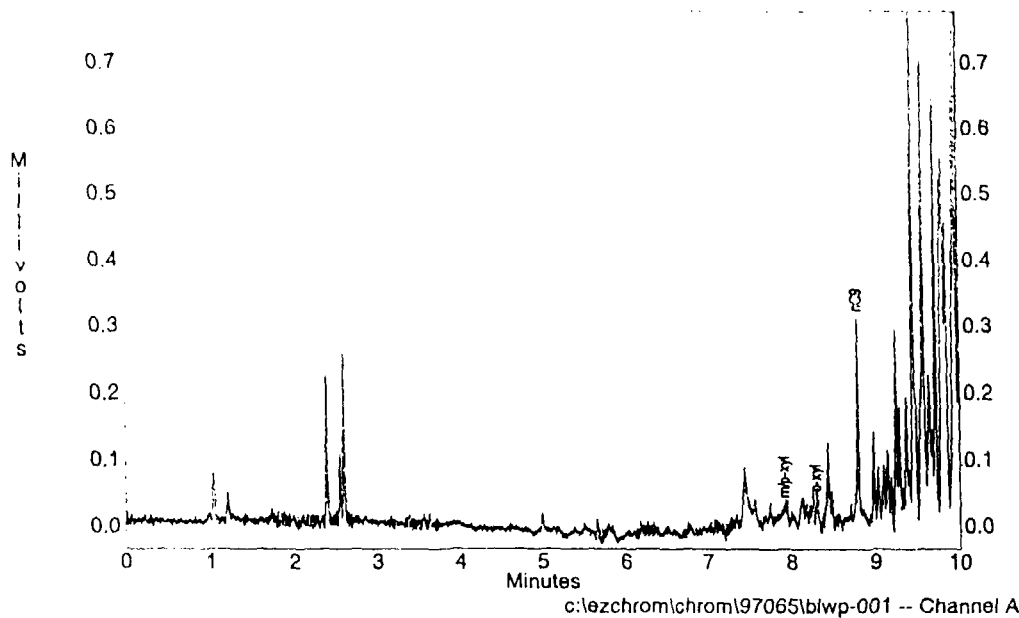
Renew. Schmidt
 8.11.97

Lenz Oil Site

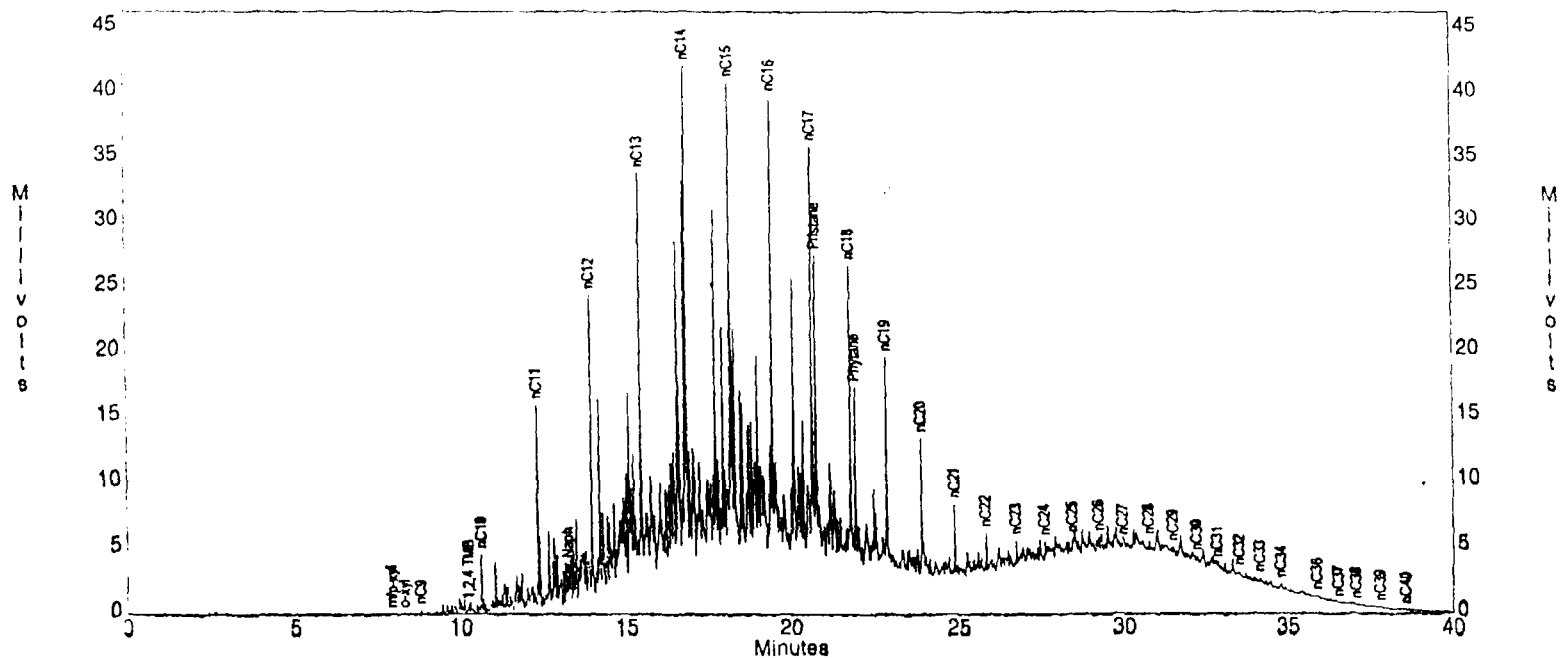
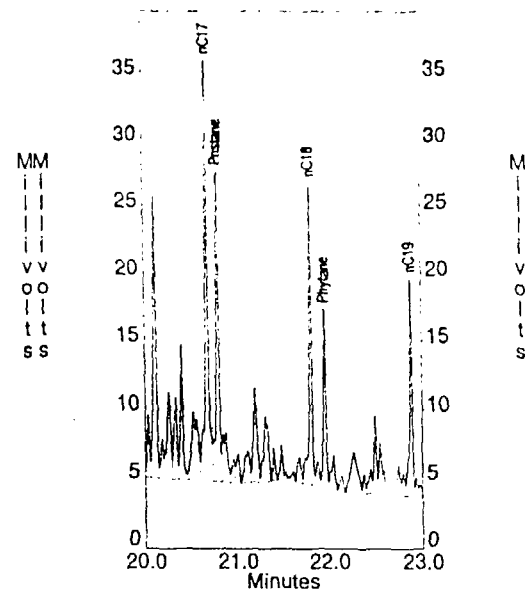
Sample ID : L-080797-WP-001

Acquired : Aug 9, 1997

c:\ezchrom\chrom\97065\blwp-001 -- Channel A



c:\ezchrom\chrom\97065\blwp-001 -- Channel A



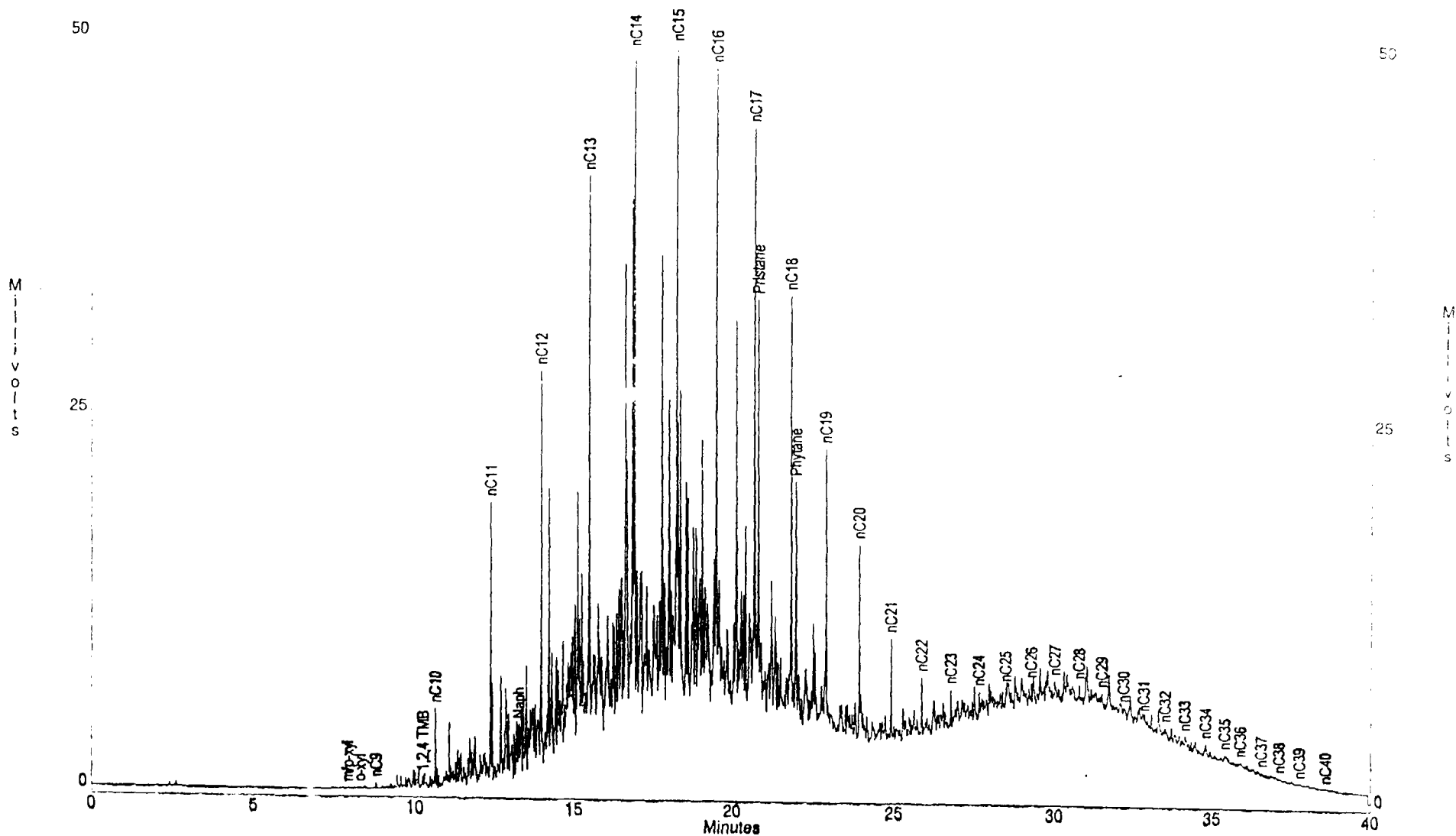
Page 1 (1)

Channel A Results

Peak	Height
nC4	0
nC5	0
nC6	0
olefin a	0
olefin b	0
olefin c	0
2,4 DMP	0
Bnz	0
Isooctane	0
nC7	0
MCHX	0
Tol	0
nC8	0
EB	0
m/p-xyI	33
o-xyI	54
nC9	323
1,2,4 TMB	617
nC10	4462
nC11	15354
Naph	2898
nC12	22728
nC13	29682
nC14	37773
nC15	36173
nC16	34091
nC17	31284
Pristane	22947
nC18	22351
Phytane	13145
nC19	16059
nC20	10115
nC21	5380
nC22	2354
nC23	1961
nC24	1671
nC25	1688
nC26	1653
nC27	1133
nC28	1005
nC29	514
nC30	526
nC31	467
nC32	443
nC33	460
nC34	502
nC35	0
nC36	163
nC37	35
nC38	72
nC39	76
nC40	38

Lenz Oil Site
 Sample ID : L-080797-WP-002
 Acquired : Aug 9, 1997

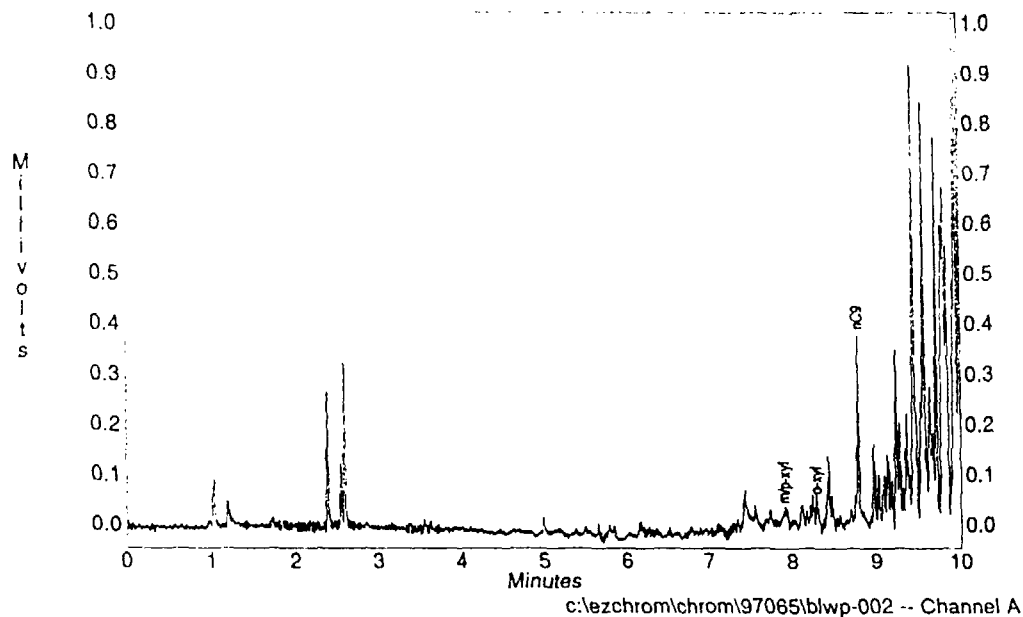
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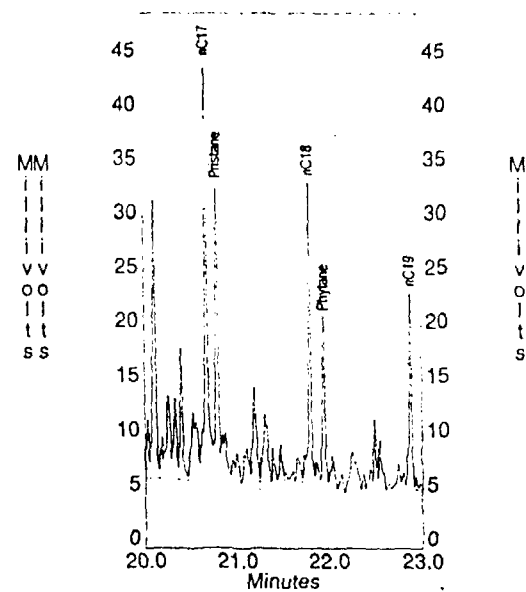
Theresa W. Schmidt
 8-11-97

Lenz Oil Site
Sample ID : L-080797-WP-002
Acquired : Aug 9, 1997

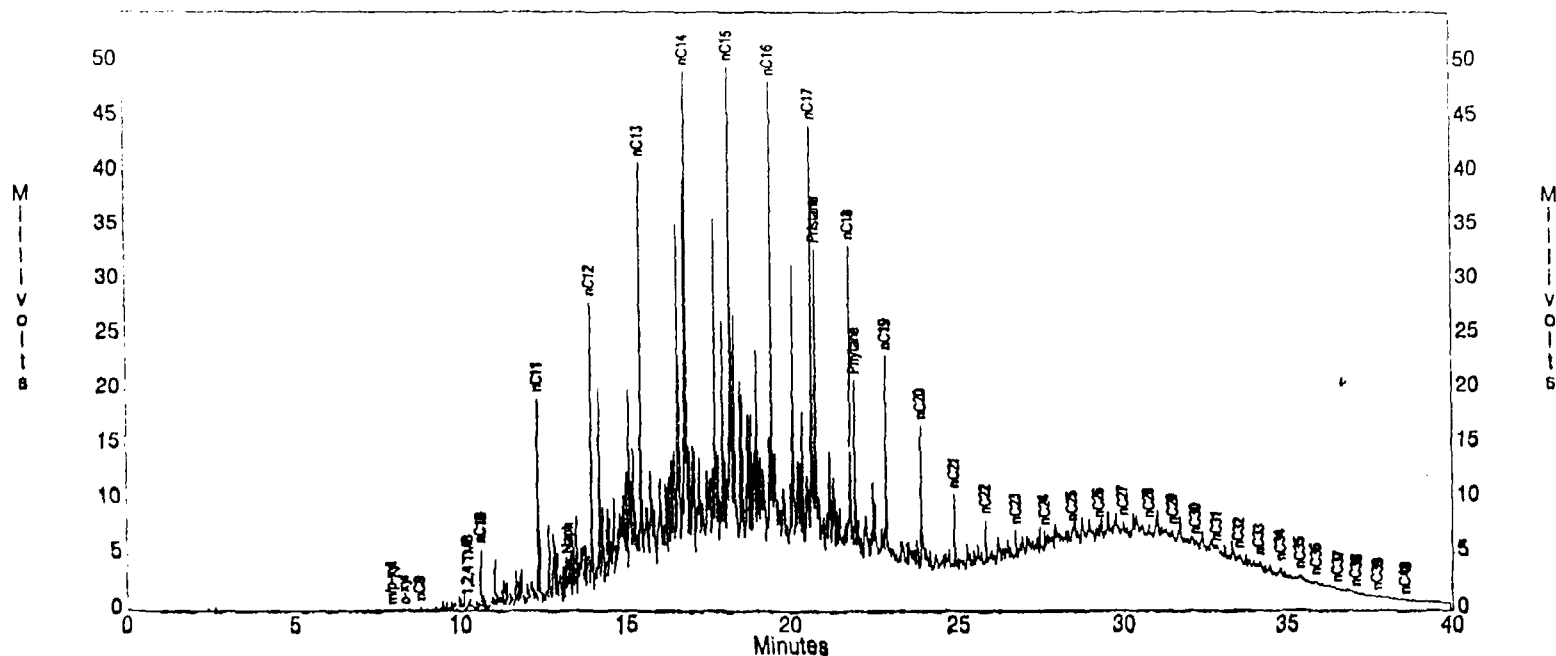
c:\ezchrom\chrom\97065\blwp-002 -- Channel A



c:\ezchrom\chrom\97065\blwp-002 -- Channel A

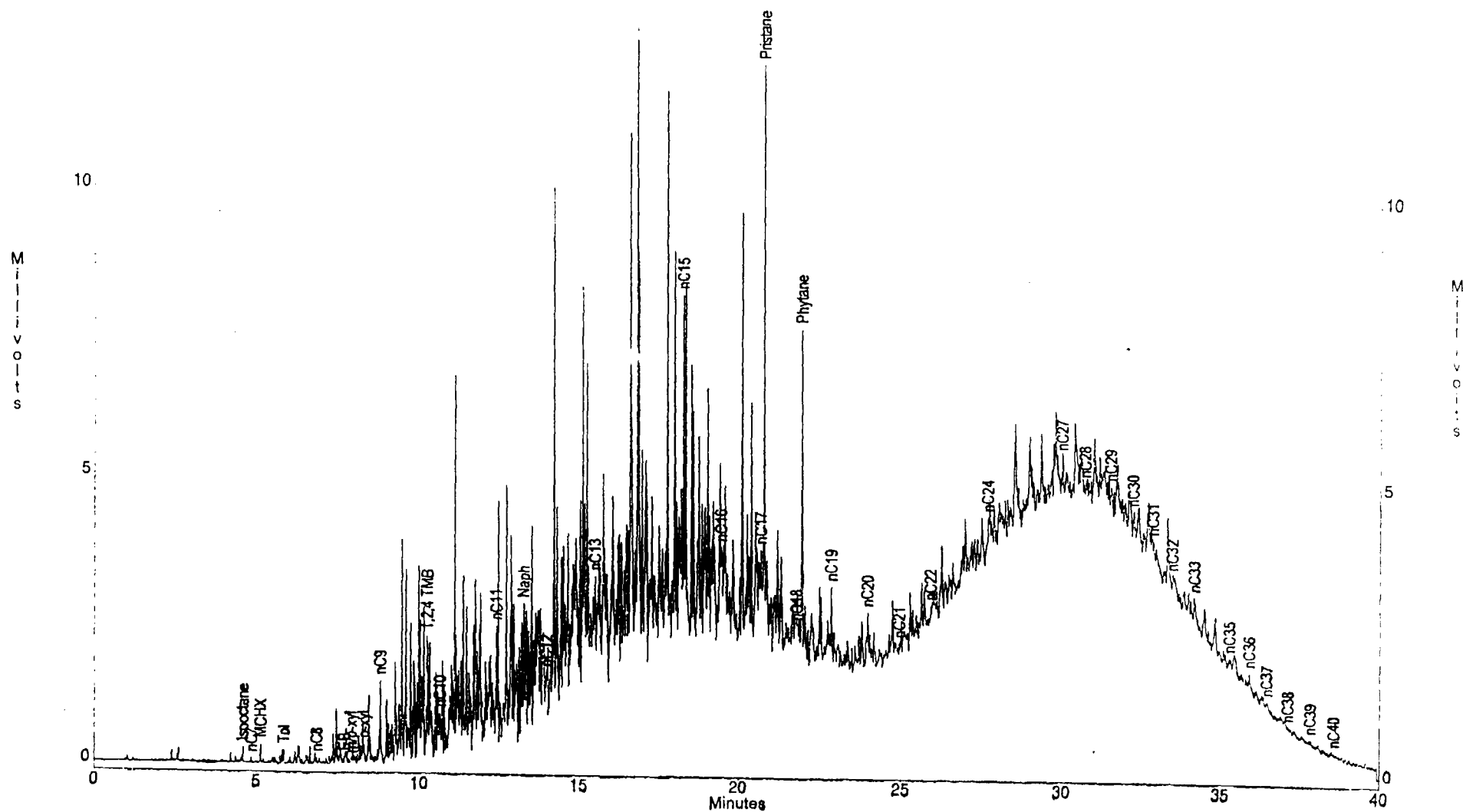


Peak	Height
nC4	0
iC5	0
nC5	0
nC6	0
olefin a	0
olefin b	0
olefin c	0
2,4 DMP	0
Bnz	0
Isooctane	0
nC7	0
MCHX	0
Tol	0
nC8	0
EB	0
m/p-xyl	46
o-xyl	67
nC9	391
1,2,4 TMB	773
nC10	5339
nC11	18498
Naph	3441
nC12	26077
nC13	36994
nC14	44027
nC15	43380
nC16	41421
nC17	38685
Pristane	27389
nC18	27902
Phytane	15740
nC19	17980
nC20	12928
nC21	6770
nC22	3962
nC23	2477
nC24	1768
nC25	1283
nC26	1991
nC27	2572
nC28	2763
nC29	2594
nC30	2021
nC31	1744
nC32	1437
nC33	1216
nC34	1093
nC35	705
nC36	452
nC37	100
nC38	128
nC39	108
nC40	74



Lenz Oil Site
Sample ID : L-080797-WP-003
Acquired : Aug 9, 1997

c:\ezchrom hrom\97065\blwp-003 -- Channel A



Gene W. Schmitt
8-11-97

Lenz Oil Site

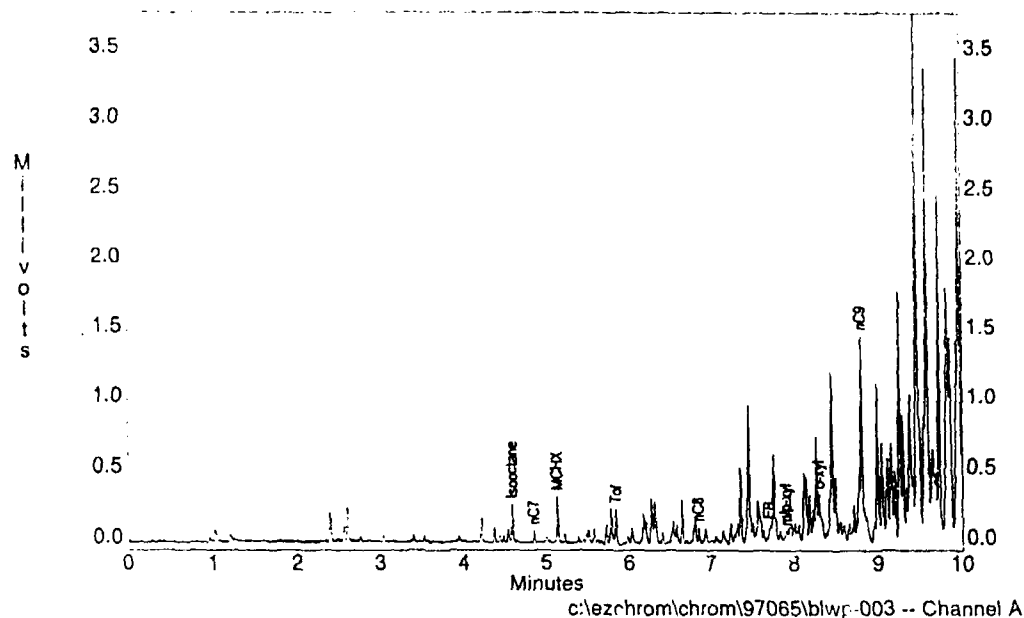
Sample ID : L-080797-WP-003

Acquired : Aug 9, 1997

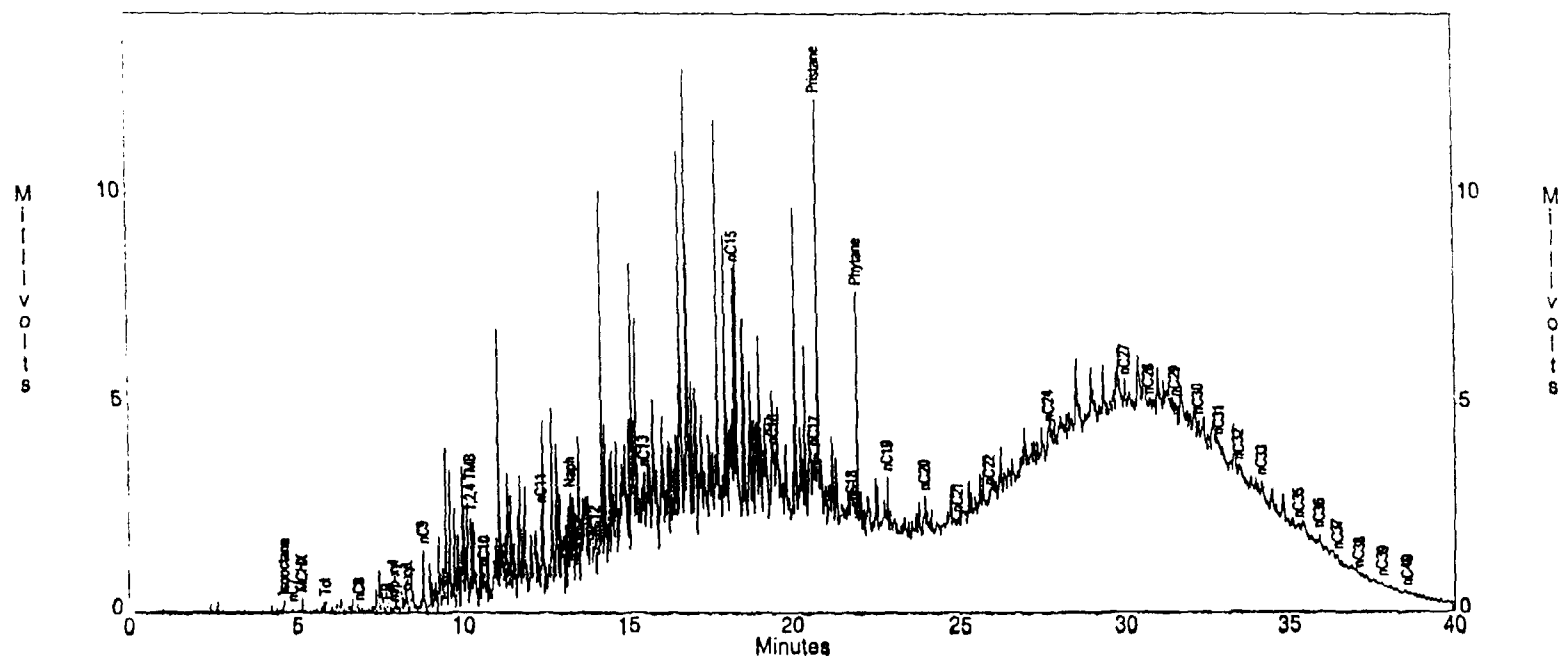
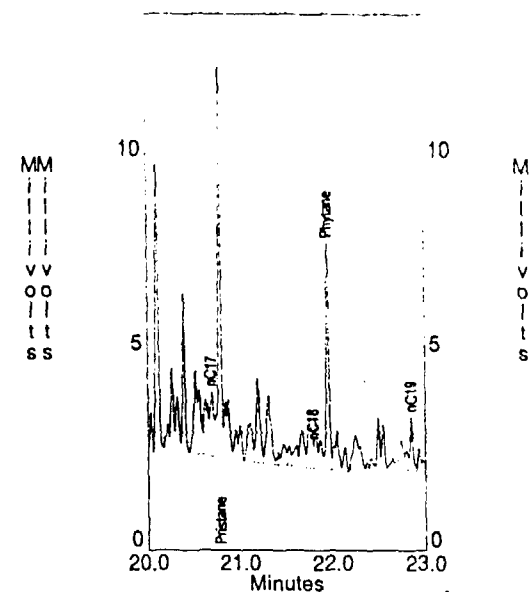
c:\ezchrom\chrom\97065\blwp-003 -- Channel A

Channel A Results

Peak	Height
nC4	0
iC5	0
nC5	0
nC6	0
olefin a	0
olefin b	0
olefin c	0
2,4 DMP	0
Bnz	0
Isooctane	274
nC7	88
MCHX	332
Tol	258
nC8	123
EB	138
m/p-xyl	91
o-xyl	349
nC9	1471
1,2,4 TMB	2146
nC10	737
nC11	1940
Naph	2337
nC12	761
nC13	1357
nC14	0
nC15	6016
nC16	1625
nC17	1623
Pristane	10140
nC18	585
Phytane	5811
nC19	1347
nC20	972
nC21	213
nC22	350
nC23	0
nC24	730
nC25	0
nC26	0
nC27	1500
nC28	1199
nC29	1330
nC30	1049
nC31	710
nC32	163
nC33	505
nC34	0
nC35	205
nC36	338
nC37	161
nC38	55
nC39	93
nC40	73

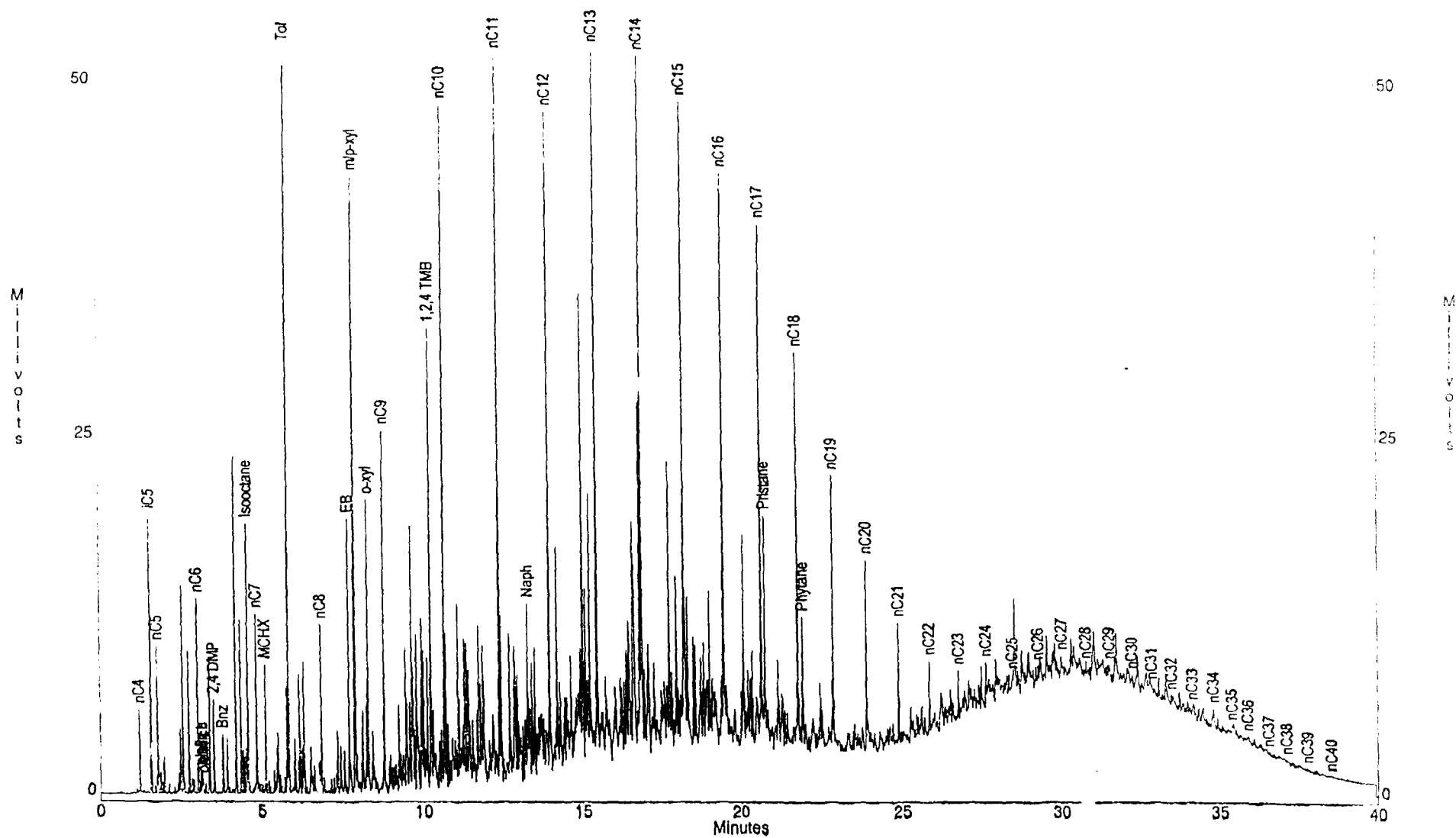


c:\ezchrom\chrom\97065\blwp-003 -- Channel A



Lenz Oil Site
Sample ID : L-080797-WP-004
Acquired : Aug 9, 1997

c:\ezchrom\chrom\970805\blwp-004 -- Channel A



Terence W. Schmidt
8.11.97

Lenz Oil Site

Sample ID : L-080797-WP-004

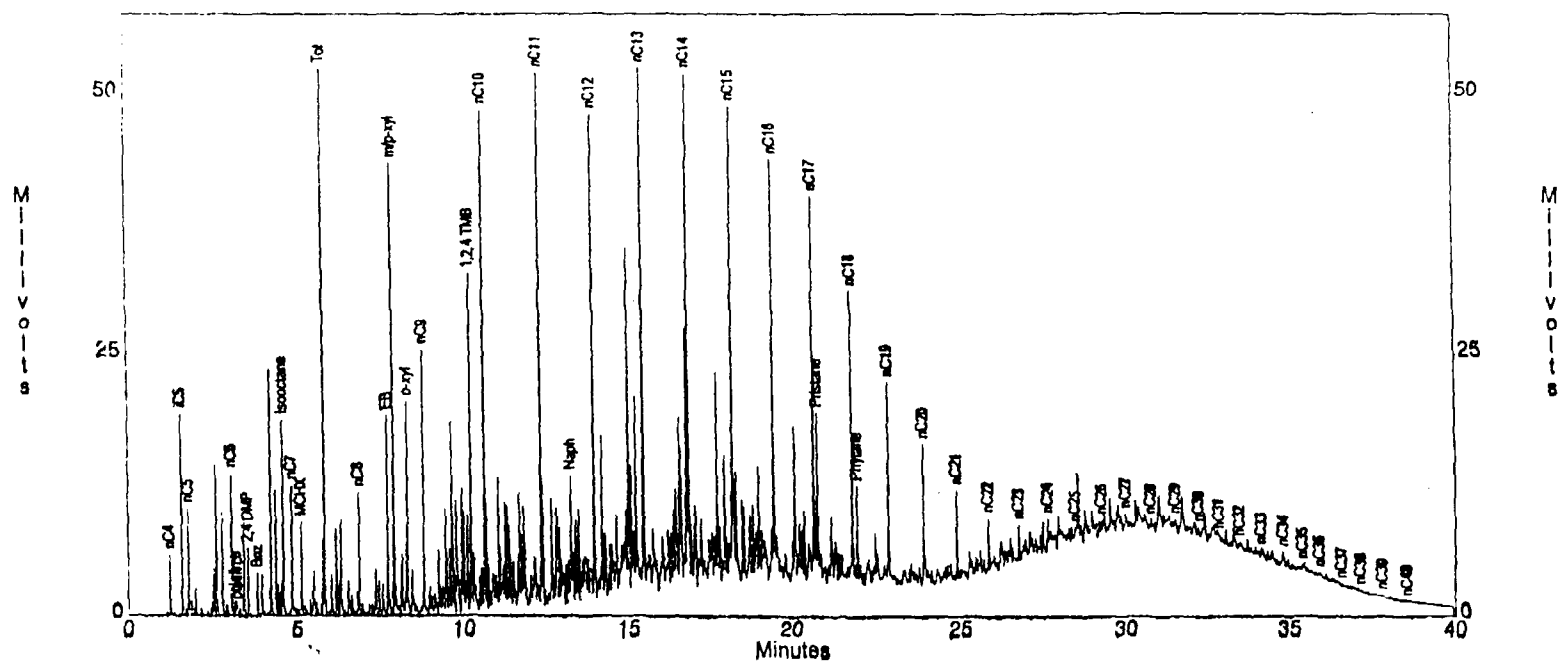
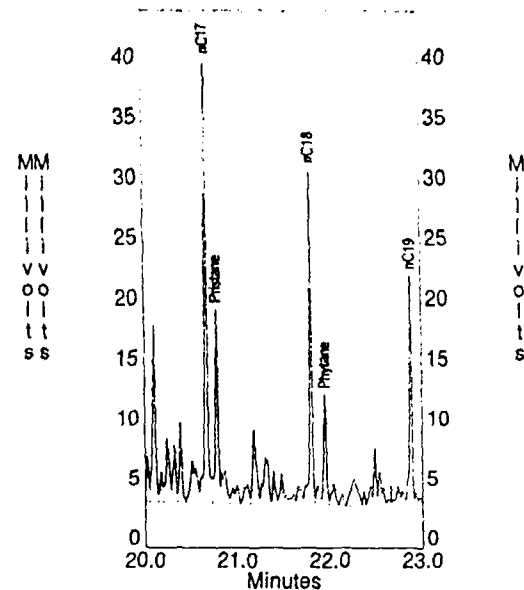
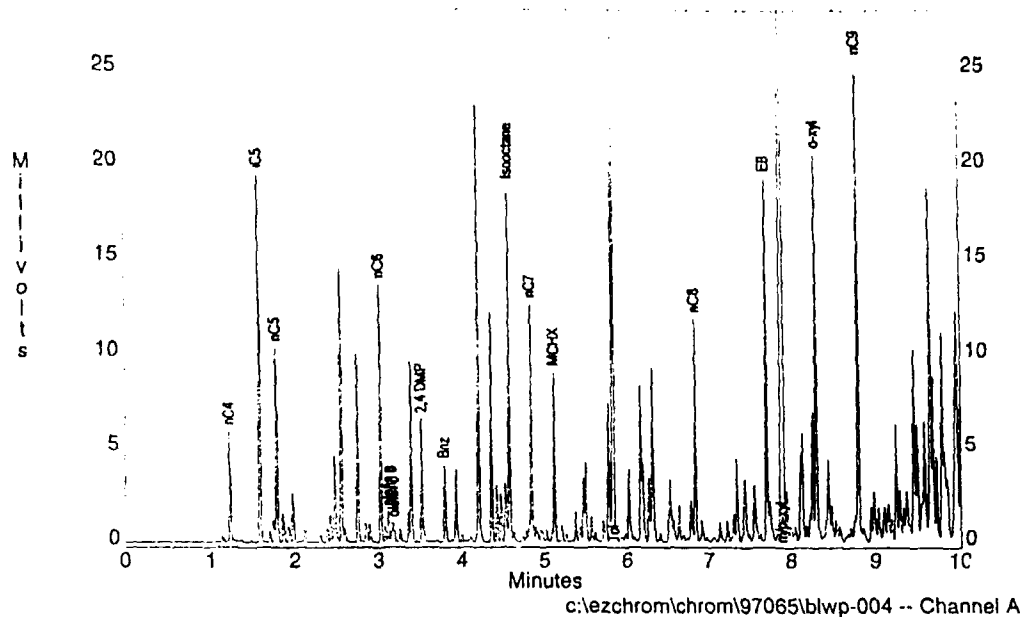
Acquired : Aug 9, 1997

c:\ezchrom\chrom\97085\blwp-004 -- Channel A

c:\ezchrom\chrom\97085\blwp-004 -- Channel A

Channel A Results

Peak	Height
nC4	5901
iC5	19466
nC5	7077
nC6	13685
olefin a	1609
olefin b	1610
olefin c	1016
2,4 DMP	6599
Bnz	4157
Isooctane	18884
nC7	12589
MCHX	9055
Tol	52569
nC8	11894
EB	19255
m/p-xy)	43350
o-xy)	20543
nC9	25450
1,2,4 TMB	31833
nC10	48082
nC11	51217
Naph	12346
nC12	46469
nC13	50088
nC14	49299
nC15	45683
nC16	39818
nC17	36834
Pristane	16219
nC18	27713
Phytane	9218
nC19	18856
nC20	13365
nC21	8468
nC22	5180
nC23	3446
nC24	3098
nC25	1062
nC26	1486
nC27	1461
nC28	1050
nC29	1019
nC30	1097
nC31	1011
nC32	963
nC33	872
nC34	1372
nC35	731
nC36	493
nC37	107
nC38	231
nC39	60
nC40	55

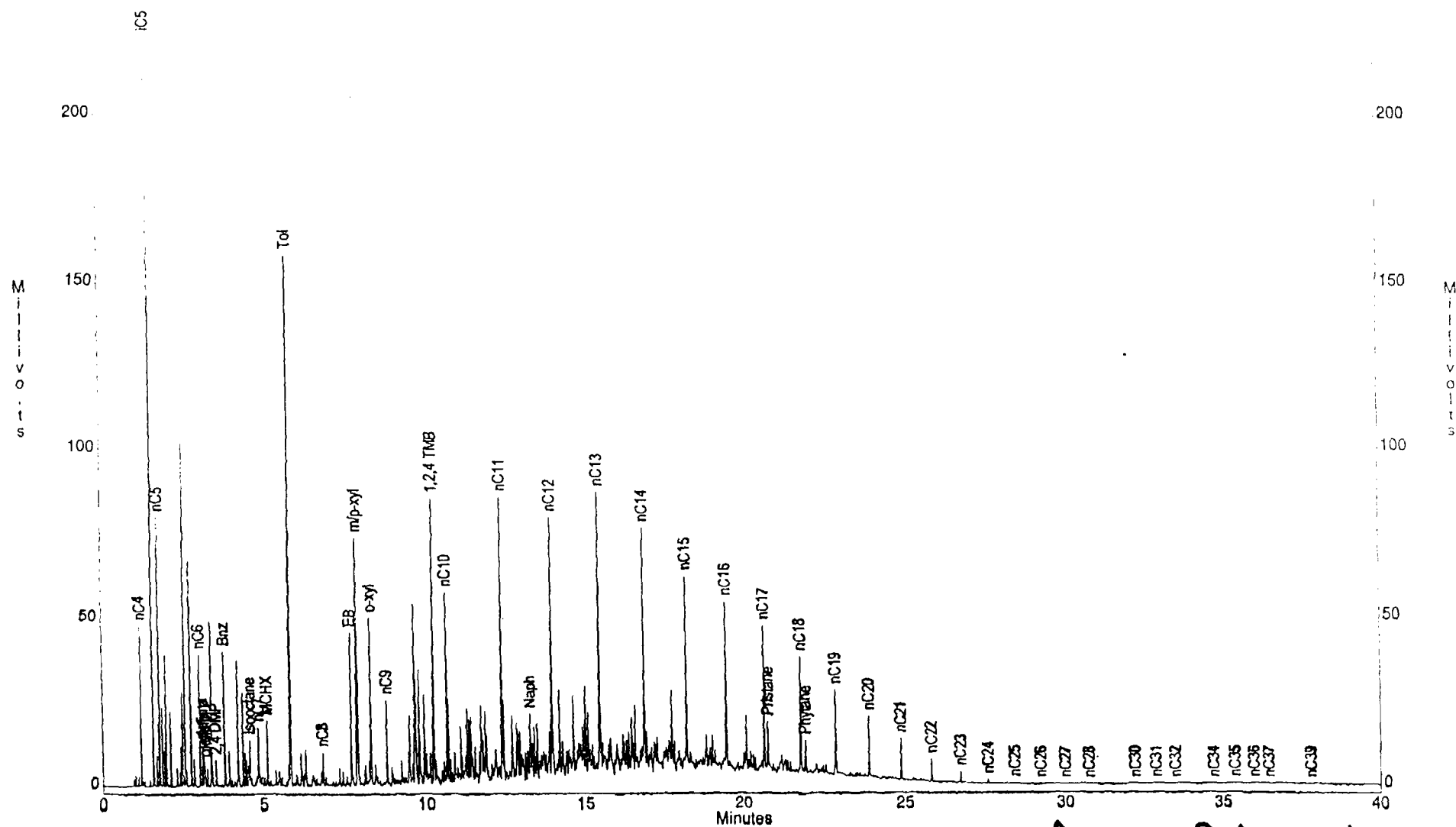


Lenz Oil Site

Sample ID : Gasoline/Diesel std

Acquired : Aug 9, 1997

c:\ezchrom\chrom\97065\blgasdie -- Channel A



Gene W. Schmidt
8-11-97

Lenz Oil Site

Sample ID : Gasoline/Diesel std

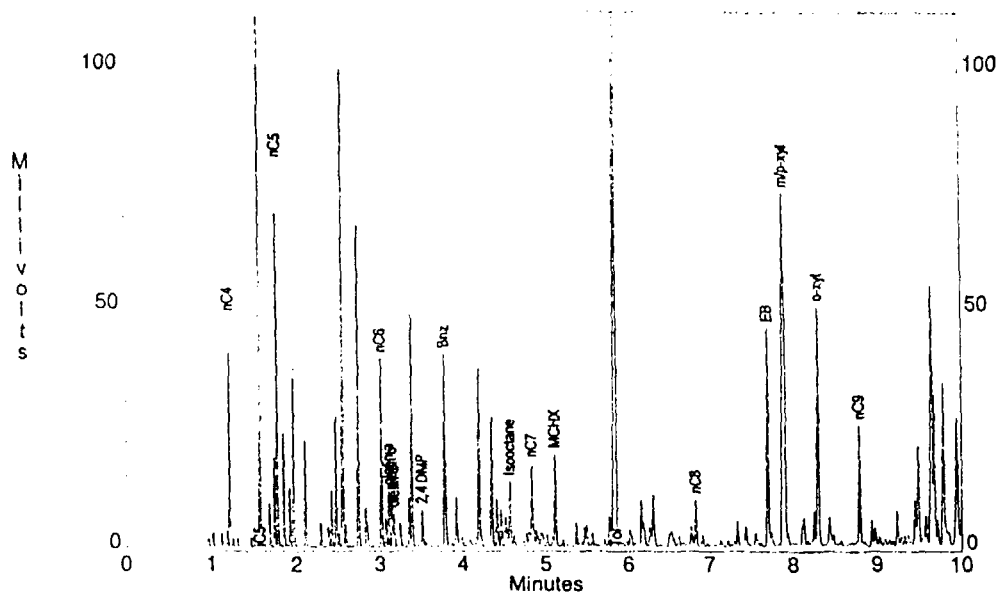
Acquired : Aug 9, 1997

c:\ezchrom\chrom\97085\blgasdie -- Channel A

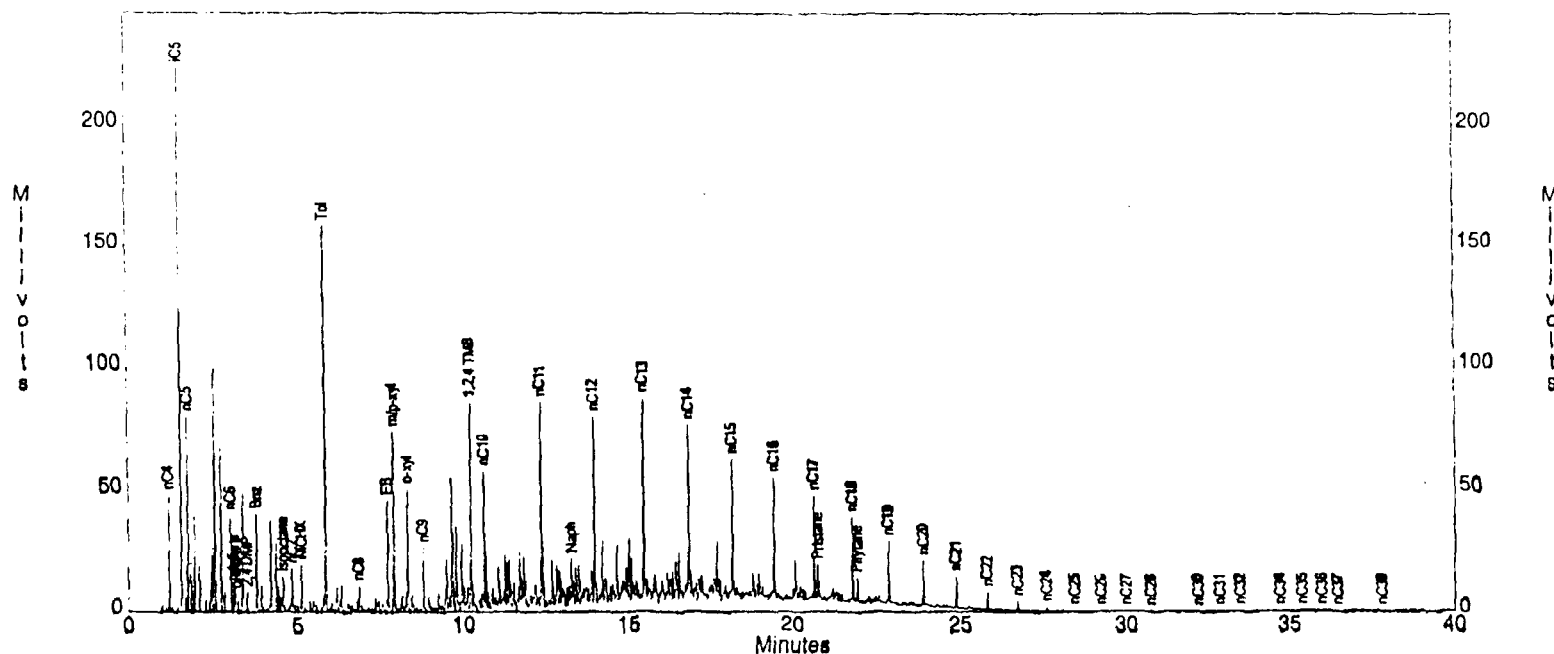
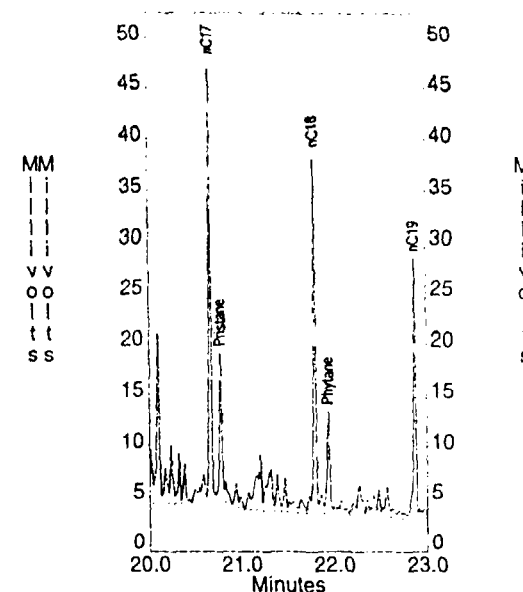
Channel A Results

Peak	Height
nC4	47975
iC5	223703
nC5	80075
nC6	39506
olefin a	11987
olefin b	11232
olefin c	7142
2,4 DMP	7840
Bnz	40387
Isooctane	13788
nC7	15871
MCHX	19624
Tol	158533
nC8	10045
EB	45786
m/p-xyl	73872
o-xyl	50163
nC9	25747
1,2,4 TMB	84155
nC10	56944
nC11	84321
Naph	19810
nC12	77188
nC13	83562
nC14	73078
nC15	58580
nC16	50862
nC17	42836
Pristane	14659
nC18	35416
Phytane	10276
nC19	25761
nC20	18438
nC21	12546
nC22	6944
nC23	3312
nC24	1257
nC25	401
nC26	154
nC27	64
nC28	36
nC29	0
nC30	28
nC31	43
nC32	54
nC33	0
nC34	47
nC35	72
nC36	63
nC37	78
nC38	0
nC39	33
nC40	0

c:\ezchrom\chrom\97065\blgasdie -- Channel A

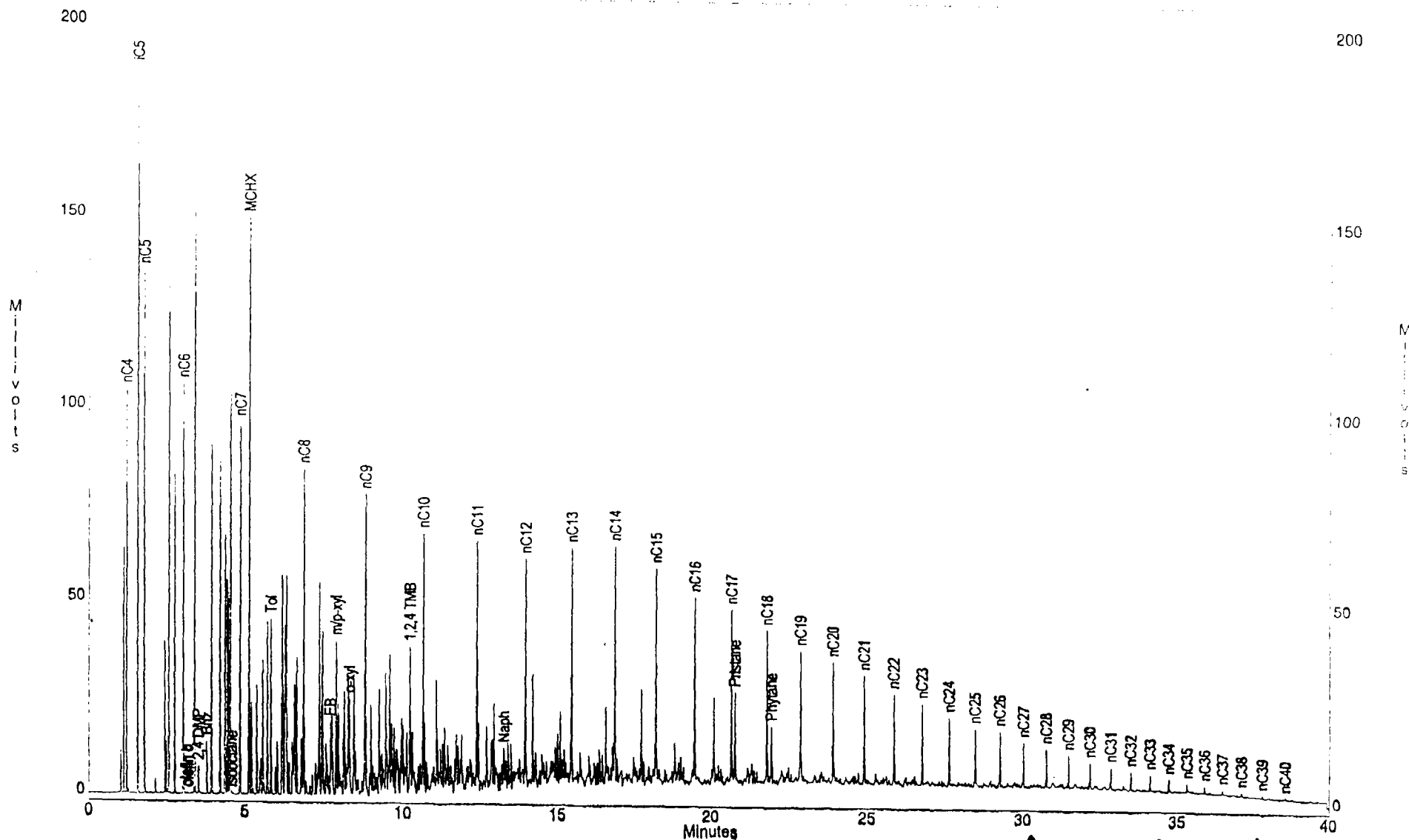


c:\ezchrom\chrom\97065\blgasdie -- Channel A



Lenz Oil Site
 Sample ID : Crude Oil Standard
 Acquired : Aug 9, 1997

c:\ezchrom\chrom\97065\blgp-7 -- Channel A



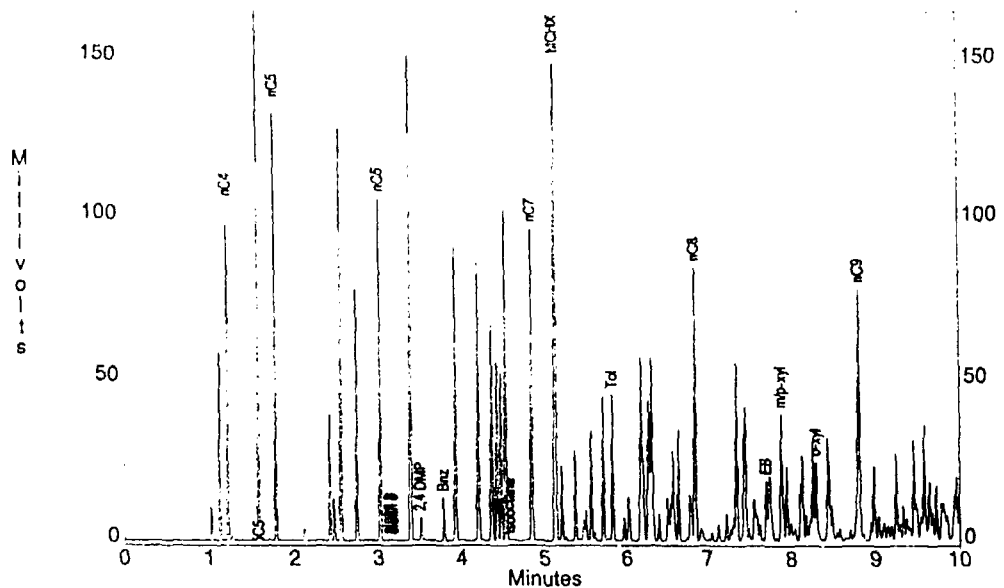
Gene W. Schmidt
 8.11.97

Lenz Oil Site

Sample ID : Crude Oil Standard

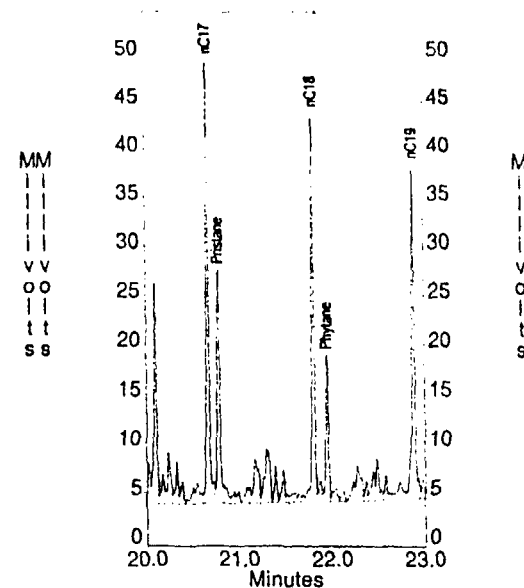
Acquired : Aug 9, 1997

c:\ezchrom\chrom\97065\blgp-7 -- Channel A



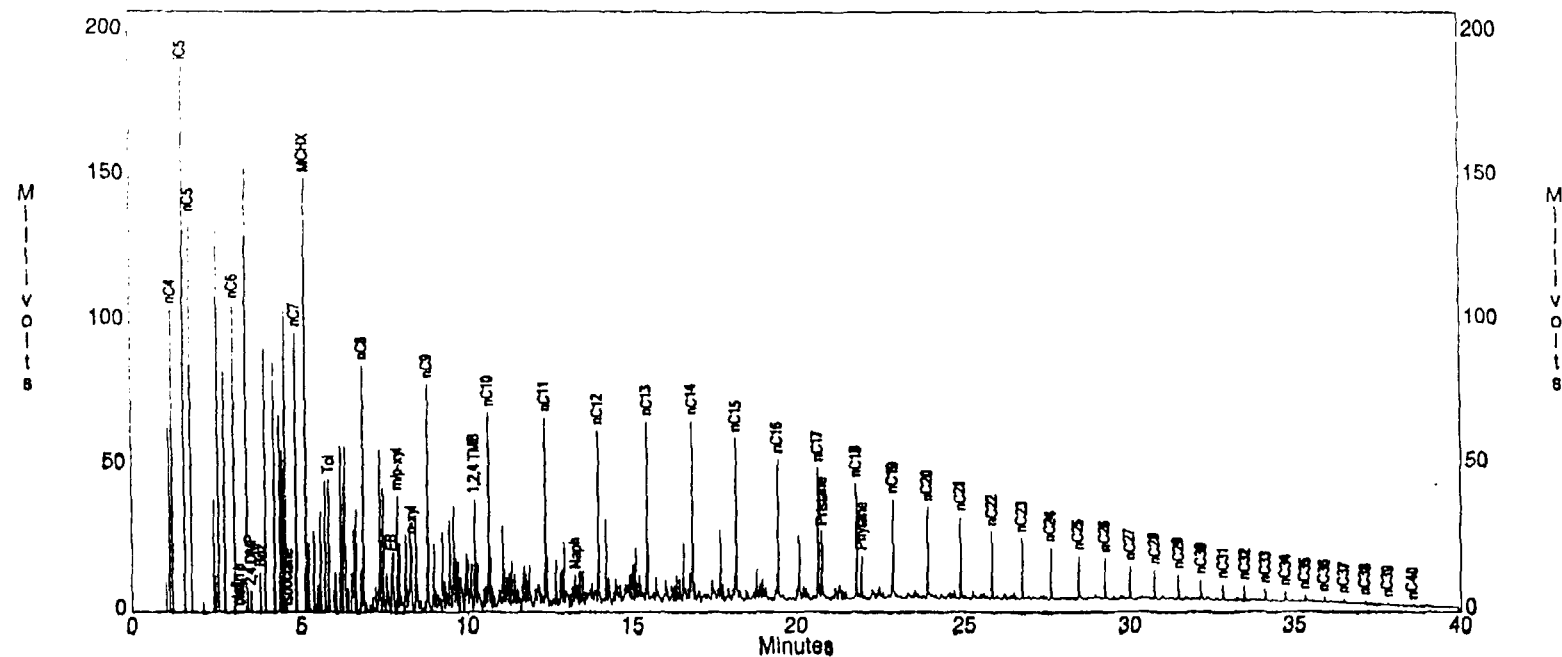
c:\ezchrom\chrom\97065\blgp-7 -- Channel A

c:\ezchrom\chrom\97065\blgp-7 -- Channel A



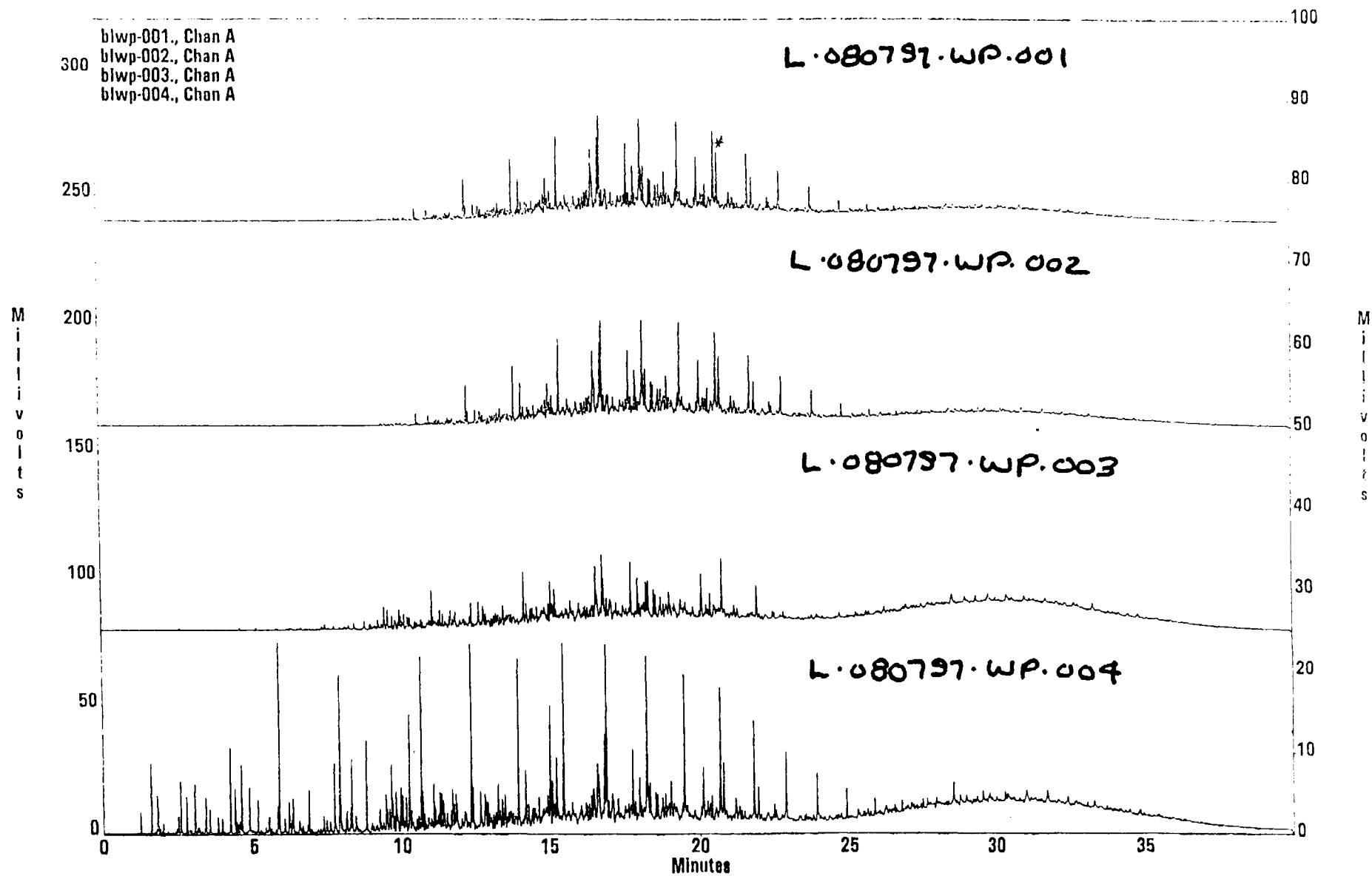
Channel A Results

Peak	Height
nC4	104617
nC5	188626
nC6	135996
nC7	106316
olefin a	313
olefin b	235
olefin c	100
2,4 DMP	7069
Bnz	13524
Isooctane	215
nC7	96628
MCHX	149980
Tol	45331
nC8	84697
EB	18678
m/p-xyl	39536
o-xyl	24412
nC9	78148
1,2,4 TMB	36511
nC10	67317
nC11	64261
Naph	10986
nC12	59649
nC13	61125
nC14	61435
nC15	56312
nC16	48716
nC17	45456
Pristane	23706
nC18	39859
Phytane	14930
nC19	34145
nC20	31216
nC21	27854
nC22	23325
nC23	20832
nC24	17536
nC25	14847
nC26	14464
nC27	11624
nC28	10041
nC29	8561
nC30	6635
nC31	5535
nC32	4951
nC33	4259
nC34	3335
nC35	2288
nC36	1896
nC37	1292
nC38	1087
nC39	802
nC40	612



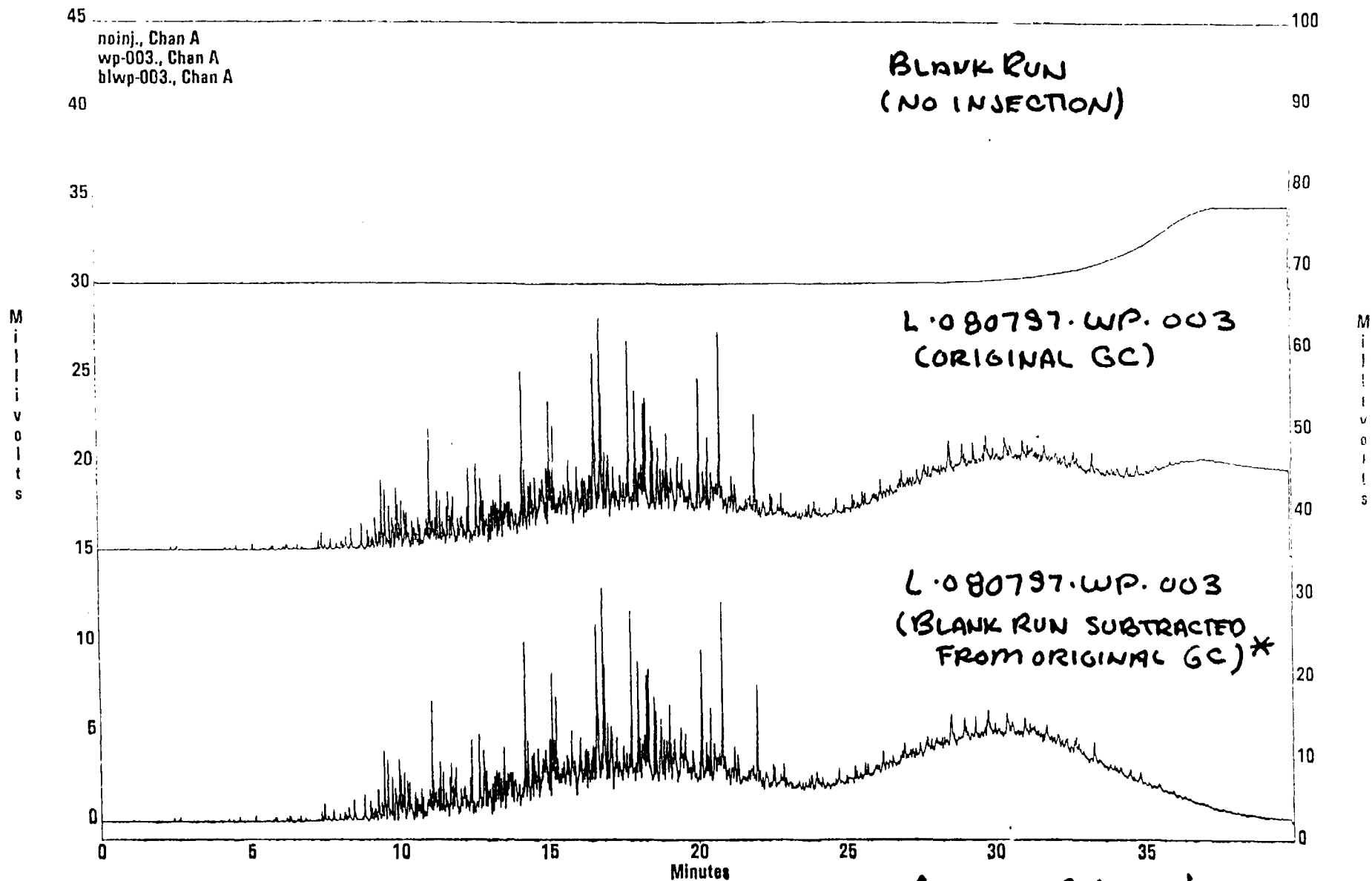
* TO PRISTANE

*
Overlaid Traces: Normalized, Aligned



Gene W. Schmidt
8-11-97

Overlaid Traces



* "BASELINE SUBTRACTION" TO
ELIMINATE COLUMN BLEED
FROM 30 MINUTES TO END.

Theresa W. Schmitt
8.11.97

Sheet1

Lenz Oil Site																
TGI Job 97065																
Peak Heights																
Sample Id	nC4	iC5	nC5	nC6	olefin a	olefin b	olefin c	2,4 DMP	Bnz	Isooct.	nC7	MCHX	Tol	nC8	EB	
L-080797-WP-001	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L-080797-WP-002	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L-080797-WP-003	0	0	0	0	0	0	0	0	0	0	274	88	332	258	123	138
L-080797-WP-004	5901	19466	7077	13685	1609	1610	1016	6599	4157	18884	12589	9055	52569	11894	19255	
Gasoline/Diesel std	47975	2E+05	80075	39506	11987	11232	7142	7840	40387	13788	15871	19624	2E+05	10045	45786	
Crude Oil Standard	1E+05	2E+05	1E+05	1E+05	313	235	100	7069	13524	215	96628	1E+05	45331	84697	18678	

Sheet1

m/p-xyI	o-xyI	nC9	1,2,4 TMB	nC10	nC11	Naph	nC12	nC13	nC14	nC15	nC16	nC17	Pris.	nC18	Phy.	nC19	nC20	nC21	nC22	nC23	nC24	nC25
33	54	323	617	4462	15354	2898	22728	29682	37773	36173	34091	31284	####	22351	13149	16059	10145	5380	2954	1961	1671	1688
46	67	391	773	5339	18498	3441	26077	36994	44027	43380	41421	38685	####	27902	15740	17980	12928	6770	3962	2477	1768	1283
91	349	1471	2146	737	1940	2337	761	1357	0	6016	1625	1623	####	585	5811	1347	972	213	350	0	730	0
43350	20543	25450	31833	48082	51217	12346	46469	50088	49299	45683	39818	36834	####	27713	9218	18856	13365	8468	5180	3446	3098	1062
73872	50163	25747	84155	56944	84321	19810	77188	83562	73078	58580	50862	42836	####	35416	10276	25761	18438	12546	6944	3312	1257	401
39536	24412	78148	36511	67317	64261	10986	59649	61125	61435	56312	48716	45456	####	39859	14930	34145	31216	27854	####	####	####	####

nC26	nC27	nC28	nC29	nC30	nC31	nC32	nC33	nC34	nC35	nC36	nC37	nC38	nC39	nC40	Area 0-11.5 min	Area 0-25 min	Area 0-40 min
1653	1133	1005	514	526	467	443	460	502	0	163	36	72	76	38	72005	5107122	7749856
1991	2572	2763	2594	2021	1744	1437	1216	1093	705	452	100	128	108	74	88946	6178143	9987827
0	1500	1199	1330	1049	710	163	505	0	205	338	161	55	93	73	168719	2330381	4967657
1486	1461	1050	1019	1097	1011	963	872	1372	731	493	107	231	60	55	1251213	5782551	10776516
154	64	36	0	28	43	54	0	47	72	63	78	0	38	0	2836016	8903638	9218676
####	####	####	8561	6635	5535	4951	4259	3335	2288	1896	1292	1087	802	612	4658749	10289230	13806590

Sheet1

Lenz Oil Site														
TGI Jcb 97065														
Peak Heights														
Sample Id	nC17/ pris	nC5/ m-p xyl	olefins/ nC6	olefins/ 2,4DMP	isooctane/ 2,4DMP	benz/ 2,4DMP	MCHx/ nC7	benz/ tol.	nC4...10/ nC11...25	nC11...25/ nC26...40	Area %			Total Area %
											Area % <C10.5	C10.5 - C22.1	Area % >C22.1	
L-080797-WP-001	1.36	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.02	37.99	0.93	64.97	34.10	100.00
L-080797-WP-002	1.41	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.02	17.06	0.89	60.97	38.14	100.00
L-080797-WP-003	0.16	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	3.77	0.00	0.14	2.37	3.40	43.51	53.09	100.00
L-080797-WP-004	2.27	0.16	0.31	0.64	2.86	0.63	0.72	0.08	0.31	33.36	11.61	42.05	46.34	100.00
Gasoline/Diesel std	2.92	1.08	0.77	3.87	1.76	5.15	1.24	0.25	0.48	848.60	30.76	65.82	3.42	100.00
Crude Oil Standard	1.92	3.44	0.01	0.09	0.03	1.91	1.55	0.30	1.11	7.84	33.74	40.78	25.48	100.00

F

APPENDIX F

IEA ANALYTICAL REPORT

SAMPLE KEY

LENZ OIL SITE LEMONT, ILLINOIS

<i>CRA Sample Number</i>	<i>Date Collected</i>	<i>Time Collected</i>	<i>Sample Source</i>
L-080797-WP-001	08/07/97		LNAPL from William's Well
L-080797-WP-002	08/07/97	8:40	LNAPL from William's Well
L-080797-WP-003	08/07/97	14:11	LNAPL from MW-5S
L-080797-WP-004	08/07/97	14:50	LNAPL From P-19
S-090297-WP-005	09/02/97	11:40	Soil From SB-2; 4 TO 6 feet bgs
S-090397-WP-006	09/03/97	10:30	Soil From SB-8; 2 TO 4 feet bgs
GW-091097-KD-007	09/10/97	9:12	Groundwater From MW-3S
GW-091097-KD-008	09/10/97	10:05	Groundwater From MW-6S
GW-091097-KD-009	09/10/97	11:05	Groundwater From P-28
GW-091097-KD-010	09/10/97	12:05	Groundwater From P-29
GW-091097-KD-011	09/10/97	12:15	Duplicate Groundwater From P-28
GW-091097-KD-012	09/10/97	13:45	Groundwater From P-30



American Environmental Network, Inc.

126 West Center Ct. Schaumburg, IL 60195 847-705-0740 847-705-1567 fax

August 26, 1997

Conestoga-Rovers
Steve Day
3615 W. Bryn Mawr Avenue

Chicago, IL 60631

Dear Steve Day:

Please find enclosed the analytical results of the samples received at our laboratory on August 08, 1997. This report contains sections addressing the following information at a minimum:

- Definitions
- Analytical Methodology
- Analytical Results
- Chain-of-custody

IEA Project#: L72971919

Client Project: LENZ OIL SITE

Purchase Order#:

IEA Quote#:

Site:

6711

Copies of this analytical report and supporting data are maintained in our files for three years; samples are retained for two weeks unless special arrangements have been made. Unless specifically indicated, all analytical testing was performed at this laboratory and no portion of the testing was subcontracted.

We appreciate your selection of our services and welcome any questions or suggestions you may have relative to this report. Please contact J. Dowse at (800) 933-2580 for any additional information. Thank you for utilizing our services, we hope you will consider us for your future analytical needs.

I have reviewed and approved the enclosed data for final release.

Sincerely

Larry D. Lewis
Director of Operations
IEA-Illinois / American Environmental Network

Sample Summary

IEA-Illinois
Laboratory ID Client ID

L72971919-001	L-080797-WP-001
L72971919-002	L-080797-WP-002
L72971919-003	L-080797-WP-003
L72971919-004	L-080797-WP-004

Client Name: Conestoga-Rovers
IEA Project #: L72971919
Client Project ID: Lenz Oil Site

PROJECT NARRATIVE

GCMS Volatiles Analysis

Samples were analyzed at the lowest possible dilution due to high levels of nontarget compounds.

EPA Target Compound List (TCL)

GCMS Volatiles Analysis

 $\mu\text{g/Kg}$

Dilution Factor		500	500	500	100000	1	PQL
Method Blank		VO081897	VO081897	VO081897	VO082197	VO081897	
Client ID		L-080797-WP-001	L-080797-WP-003	L-080797-WP-004	L-080797-WP-004	Method Blank	
Analyte	Lab ID	001	003	004	004 DL	VO081897	
Chloromethane	UD	UD	UD	UD	UD	U	5
Bromomethane	UD	UD	UD	UD	UD	U	5
Vinyl Chloride	UD	UD	UD	UD	UD	U	5
Chloroethane	UD	UD	23000	UD	UD	U	5
Methylene Chloride	UD	UD	UD	UD	UD	U	5
Acetone	5800	UD	UD	UD	UD	U	10
Carbon Disulfide	UD	UD	UD	UD	UD	U	5
1,1-Dichloroethene	UD	UD	4200	UD	UD	U	5
1,1-Dichloroethane	UD	UD	120000 E	UD	UD	U	5
cis-1,2-Dichloroethene	UD	UD	320000 E	UD	UD	U	5
trans-1,2-Dichloroethene	UD	UD	UD	UD	UD	U	5
Chloroform	UD	UD	UD	UD	UD	U	5
1,2-Dichloroethane	UD	UD	UD	UD	UD	U	5
2-Butanone	UD	UD	UD	UD	UD	U	10
1,1, 1-Trichloroethane	UD	UD	170000 E	UD	UD	U	5
Carbon Tetrachloride	UD	UD	UD	UD	UD	U	5
Bromodichloromethane	UD	UD	UD	UD	UD	U	5
1,2-Dichloropropane	UD	UD	5500	UD	UD	U	5
Trans-1,3-dichloropropene	UD	UD	UD	UD	UD	U	5
Trichloroethene	UD	UD	UD	UD	UD	U	5
Dibromochloromethane	UD	UD	UD	UD	UD	U	5
1,1,2-Trichloroethane	UD	UD	UD	UD	UD	U	5
Benzene	UD	UD	240000 E	UD	UD	U	5
cis-1,3-Dichloropropene	UD	UD	UD	UD	UD	U	5
Bromoform	UD	UD	UD	UD	UD	U	5
4-Methyl-2-Pentanone	UD	UD	UD	UD	UD	U	10
2-Hexanone	UD	UD	UD	UD	UD	U	10
Tetrachloroethene	UD	UD	8400	UD	UD	U	5
1,1,2,2-Tetrachloroethane	UD	UD	UD	UD	UD	U	5
Toluene	UD	UD	1800000 E	3700000	UD	U	5
Chlorobenzene	UD	UD	11000	UD	UD	U	5
Ethylbenzene	UD	6900	710000 E	1400000	UD	U	5
Styrene	UD	UD	UD	UD	UD	U	5
Total Xylenes	4700	29000	3400000 E	6400000	UD	U	10
Date Sampled	8/7/97	8/7/97	8/7/97	8/7/97	---		
Date Analyzed	8/18/97	8/18/97	8/18/97	8/21/97	8/18/97		

PQL = Practical Quantitation Limit

To obtain the sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

Client: Lenz Oil Storage K0001
 IEA Job#: L72971919
 Project ID: LENZ OIL SITE
 Matrix: Oil
 Method: 8240/8260

EPA Target Compound List (TCL)
 GCMS Volatiles Analysis
 µg/Kg

Analyte	Dilution Factor					PQL
	1					
	Method Blank	VO082197				
	Client ID	Method Blank				
Lab ID	VO082197					
Chloromethane	U					5
Bromomethane	U					5
Vinyl Chloride	U					5
Chloroethane	U					5
Methylene Chloride	U					5
Acetone	U					10
Carbon Disulfide	U					5
1,1-Dichloroethene	U					5
1,1-Dichloroethane	U					5
cis-1,2-Dichloroethene	U					5
trans-1,2-Dichloroethene	U					5
Chloroform	U					5
1,2-Dichloroethane	U					5
2-Butanone	U					10
1,1, 1-Trichloroethane	U					5
Carbon Tetrachloride	U					5
Bromodichloromethane	U					5
1,2-Dichloropropane	U					5
Trans-1,3-dichloropropene	U					5
Trichloroethene	U					5
Dibromochloromethane	U					5
1,1,2-Trichloroethane	U					5
Benzene	U					5
cis-1,3-Dichloropropene	U					5
Bromoform	U					5
4-Methyl-2-Pentanone	U					10
2-Hexanone	U					10
Tetrachloroethene	U					5
1,1,2,2-Tetrachloroethane	U					5
Toluene	U					5
Chlorobenzene	U					5
Ethylbenzene	U					5
Styrene	U					5
Total Xylenes	U					10
Date Sampled		---				
Date Analyzed		8/21/97				

PQL = Practical Quantitation Limit

To obtain the sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

FORM II
VOLATILE ORGANIC SURROGATE RECOVERY

Lab Name : IEA, Inc.
Matrix : (soil/water) Oil

Client Name : Conestoga Rovers
Method No. : 8240/8260

	Sample No.	S1 (DCE) #	S2 (TOL) #	S3 (BFB) #	Other #	TOT OUT
01	VO081897	92%	96%	89%		0
02	QCKK081897	95%	95%	102%		0
03	VO082197	97%	97%	87%		0
04	QCKK082197	96%	97%	98%		0
05	L72971919-001	99%	98%	92%		0
06	L72971919-003	93%	106%	120%		0
07	L72971919-004	102%	116%	119%		0
08	L72971919-004DL	99%	98%	84%		0
09	L72971953-001MS	93%	94%	105%		0
10	L72971953-001MD	97%	95%	99%		0
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

S1 (DCE) = 1,2-Dichloroethane-d4	QC Limits
S2 (TOL) = Toluene-d8	70-121%
S3 (BFB) = Bromofluorobenzene	81-117%
Other= Not Used	74-121%

#--Column used to flag recovery values

*--Value outside QC Limits

D--Surrogates diluted out

FORM III
ORGANIC QC CHECK SHEET

Lab Name : IEA, Inc. _____
Matrix : (soil/water) Soil _____

Sample No. : VO082197 _____
Method No. : 8240B/8260A _____

COMPOUND	Spike Added (µg/Kg)	Sample Concentration (µg/Kg)	MS Concentration (µg/Kg)	MS % Rec	QC Limits Rec. #
1,1-Dichloroethene	50	0	54	108%	59-172
Trichloroethene	50	0	50	100%	62-137
Benzene	50	0	53	106%	66-142
Toluene	50	0	54	108%	59-139
Chlorobenzene	50	0	54	108%	60-133

#--Column to be used to flag recovery and RPD values with an asterisk

*--Values outside of QC Limits

Spike Recovery : 0 out of 5 outside limits

Comments: _____

FORM III
ORGANIC QC CHECK FORM

Lab Name : IEA, Inc.
Matrix : (soil/water) Soil

Sample No. : VO081897
Method No. : 8240B/8260A

COMPOUND	Spike Added (µg/Kg)	Sample Concentration (µg/Kg)	MS Concentration (µg/Kg)	MS % Rec #	QC Limits Rec.
1,1-Dichloroethene	50	0	54	108%	59-172
Trichloroethene	50	0	55	110%	62-137
Benzene	50	0	51	102%	66-142
Toluene	50	0	51	102%	59-139
Chlorobenzene	50	0	54	108%	60-133

#--Column to be used to flag recovery and RPD values with an asterisk

*--Values outside of QC Limits

Spike Recovery : 0 out of 5 outside limits

Comments: _____

Method : K:\CHEMSTN\MSO\METHODS\TCLSOIL.M
 Title : Method 8240B/8260A in Soil, Calib on 8/11/97
 Last Update : Mon Aug 11 11:52:03 1997
 Response via : Initial Calibration

Non-Spiked Sample: MS05478.D

Spike Sample	Spike Duplicate Sample
File ID : MS05465.D	MS05467.D
Sample : L72971953-001ms	L72971953-001msd
Acq Time: 18 Aug 97 15:43	18 Aug 97 17:02

Compound	Sample Conc	Spike Added	Spike Res	Dup Res	Spike %Rec	Dup %Rec	RPD	QC Limits RPD	% Rec
1,1-dichloroethene	0.0	50	51	52	103	103	0	22	59-172
benzene	0.0	50	49	52	99	103	4	24	66-142
trichloroethene	0.5	50	50	55	99	109	10	21	62-137
luene	0.7	50	51	53	101	104	3	21	59-139
chlorobenzene	0.3	50	51	52	102	103	1	21	60-133

- Fails Limit Check

TCLSOIL.M

Tue Aug 19 13:36:39 1997

CONESTOGA-ROVERS & ASSOCIATES
8615 W. Bryn Mawr Avenue
Chicago, Illinois 60631 (773)380-9933

REFERENCE NUMBER:
6711

PROJECT NAME: Watten J. Pichon ^{WTP8/197}
 Long Oil Site

CHAIN OF CUSTODY RECORD

**SAMPLER'S
SIGNATURE:**

PRINTED NAME: Walter J. Pachon

No. OF CONTAINERS	DATE	TIME	LOCATION	REMARKS
1	10/10/2023	10:00	1000	1000
2	10/10/2023	10:00	1000	1000
3	10/10/2023	10:00	1000	1000
4	10/10/2023	10:00	1000	1000
5	10/10/2023	10:00	1000	1000
6	10/10/2023	10:00	1000	1000
7	10/10/2023	10:00	1000	1000
8	10/10/2023	10:00	1000	1000
9	10/10/2023	10:00	1000	1000
10	10/10/2023	10:00	1000	1000
11	10/10/2023	10:00	1000	1000
12	10/10/2023	10:00	1000	1000
13	10/10/2023	10:00	1000	1000
14	10/10/2023	10:00	1000	1000
15	10/10/2023	10:00	1000	1000
16	10/10/2023	10:00	1000	1000
17	10/10/2023	10:00	1000	1000
18	10/10/2023	10:00	1000	1000
19	10/10/2023	10:00	1000	1000
20	10/10/2023	10:00	1000	1000
21	10/10/2023	10:00	1000	1000
22	10/10/2023	10:00	1000	1000
23	10/10/2023	10:00	1000	1000
24	10/10/2023	10:00	1000	1000
25	10/10/2023	10:00	1000	1000
26	10/10/2023	10:00	1000	1000
27	10/10/2023	10:00	1000	1000
28	10/10/2023	10:00	1000	1000
29	10/10/2023	10:00	1000	1000
30	10/10/2023	10:00	1000	1000
31	10/10/2023	10:00	1000	1000
32	10/10/2023	10:00	1000	1000
33	10/10/2023	10:00	1000	1000
34	10/10/2023	10:00	1000	1000
35	10/10/2023	10:00	1000	1000
36	10/10/2023	10:00	1000	1000
37	10/10/2023	10:00	1000	1000
38	10/10/2023	10:00	1000	1000
39	10/10/2023	10:00	1000	1000
40	10/10/2023	10:00	1000	1000
41	10/10/2023	10:00	1000	1000
42	10/10/2023	10:00	1000	1000
43	10/10/2023	10:00	1000	1000
44	10/10/2023	10:00	1000	1000
45	10/10/2023	10:00	1000	1000
46	10/10/2023	10:00	1000	1000
47	10/10/2023	10:00	1000	1000
48	10/10/2023	10:00	1000	1000
49	10/10/2023	10:00	1000	1000
50	10/10/2023	10:00	1000	1000
51	10/10/2023	10:00	1000	1000
52	10/10/2023	10:00	1000	1000
53	10/10/2023	10:00	1000	1000
54	10/10/2023	10:00	1000	1000
55	10/10/2023	10:00	1000	1000
56	10/10/2023	10:00	1000	1000
57	10/10/2023	10:00	1000	1000
58	10/10/2023	10:00	1000	1000
59	10/10/2023	10:00	1000	1000
60	10/10/2023	10:00	1000	1000
61	10/10/2023	10:00	1000	1000
62	10/10/2023	10:00	1000	1000
63	10/10/2023	10:00	1000	1000
64	10/10/2023	10:00	1000	1000
65	10/10/2023	10:00	1000	1000
66				

PARAMETERS

REMARKS

[illegible]

TOTAL NUMBER OF CONTAINERS	9
----------------------------	---

RELINQUISHED BY:

①

DATE: 8/1/97

TIME: 1630

RECEIVED BY:

②

DATE:

TIME:

RELINQUISHED BY:

②

DATE:

TIME:

RECEIVED BY:

③

DATE:

TIME:

RELINQUISHED BY:

③

DATE:

TIME:

RECEIVED BY:

④

DATE:

TIME:

METHOD OF SHIPMENT:

AIR BILL No.

White	-Fully Executed Copy
Yellow	-Receiving Laboratory Copy
Pink	-Shipper Copy
Goldenrod	-Sampler Copy

SAMPLE TEAM:

W. Pochron
K. Puchner

RECEIVED FOR LABORATORY BY:

DATE: TIME:

2776



American Environmental Network

126 West Center Court • Schaumburg, IL 60195 • (847) 705-0740 • Fax (847) 705-1567 • 1-800-933-2580

September 16, 1997

Conestoga-Rovers
Steve Day
8615 W. Bryn Mawr Avenue

Chicago, IL 60631

Dear Steve Day:

Please find enclosed the analytical results of the samples received at our laboratory on September 05, 1997. This report contains sections addressing the following information at a minimum:

- Definitions
- Analytical Methodology
- Analytical Results
- Chain-of-custody

IEA Project#: L72972129

Client Project: LENZ OIL SITE

Purchase Order#:

IEA Quote#:

Site:

LENZ OIL SITE

Copies of this analytical report and supporting data are maintained in our files for three years; samples are retained for two weeks unless special arrangements have been made. Unless specifically indicated, all analytical testing was performed at this laboratory and no portion of the testing was subcontracted.

We appreciate your selection of our services and welcome any questions or suggestions you may have relative to this report. Please contact Jim Dowse at (800) 933-2580 for any additional information. Thank you for utilizing our services, we hope you will consider us for your future analytical needs.

I have reviewed and approved the enclosed data for final release.

Sincerely

Larry D. Lewis
Director of Operations
IEA-Illinois / American Environmental Network

Sample Summary

IEA-Illinois

Laboratory ID

Client ID

L72972129-001
L72972129-002

S-090297-WP-005
S-090397-WP-006

Client Name: Conestoga-Rovers
IEA Project #: L72972129
Client Project ID: Lenz Oil Site

PROJECT NARRATIVE

GCMS Volatiles Analysis

Sample S-090297-WP-005 was analyzed twice and confirmed low internal standard/high surrogate recoveries due to matrix interference.

Client : Conestoga-Rovers
 Project ID : LENZ OIL SITE
 Site : LENZ OIL SITE

**EPA Target Compound List (TCL)
 GCMS Volatiles Analysis**

Lab Sample Number : L72972129-001	Method: 8260
Client ID : S-090297-WP-005	Matrix : SOIL

<u>Compound</u>	<u>Result</u>	<u>PQL</u>	<u>Units</u>	<u>Dilution Factor</u>	<u>Sample Date</u>	<u>Analysis Date</u>
Chloromethane	< 5	5	ug/Kg	1	9/ 2/97	9/11/97
Vinyl Chloride	< 5	5	ug/Kg	1	9/ 2/97	9/11/97
Bromomethane	< 5	5	ug/Kg	1	9/ 2/97	9/11/97
Chloroethane	< 5	5	ug/Kg	1	9/ 2/97	9/11/97
1,1-Dichloroethene	< 5	5	ug/Kg	1	9/ 2/97	9/11/97
Methylene Chloride	< 5	5	ug/Kg	1	9/ 2/97	9/11/97
trans-1,2-Dichloroethene	< 5	5	ug/Kg	1	9/ 2/97	9/11/97
1,1-Dichloroethane	< 5	5	ug/Kg	1	9/ 2/97	9/11/97
cis-1,2-Dichloroethene	< 5	5	ug/Kg	1	9/ 2/97	9/11/97
Chloroform	< 5	5	ug/Kg	1	9/ 2/97	9/11/97
1,1,1-Trichloroethane	< 5	5	ug/Kg	1	9/ 2/97	9/11/97
Carbon Tetrachloride	< 5	5	ug/Kg	1	9/ 2/97	9/11/97
Benzene	34	5	ug/Kg	1	9/ 2/97	9/11/97
1,2-Dichloroethane	< 5	5	ug/Kg	1	9/ 2/97	9/11/97
Trichloroethene	< 5	5	ug/Kg	1	9/ 2/97	9/11/97
1,2-Dichloropropane	< 5	5	ug/Kg	1	9/ 2/97	9/11/97
Bromodichloromethane	< 5	5	ug/Kg	1	9/ 2/97	9/11/97
cis-1,3-Dichloropropene	< 5	5	ug/Kg	1	9/ 2/97	9/11/97
Toluene	< 5	5	ug/Kg	1	9/ 2/97	9/11/97
trans-1,3-Dichloropropene	< 5	5	ug/Kg	1	9/ 2/97	9/11/97
1,1,2-Trichloroethane	< 5	5	ug/Kg	1	9/ 2/97	9/11/97
Tetrachloroethene	6	5	ug/Kg	1	9/ 2/97	9/11/97
Dibromochloromethane	< 5	5	ug/Kg	1	9/ 2/97	9/11/97
Chlorobenzene	< 5	5	ug/Kg	1	9/ 2/97	9/11/97
Ethylbenzene	32	5	ug/Kg	1	9/ 2/97	9/11/97
Xylenes, Total	160	10	ug/Kg	1	9/ 2/97	9/11/97
Styrene	< 5	5	ug/Kg	1	9/ 2/97	9/11/97
Bromoform	< 5	5	ug/Kg	1	9/ 2/97	9/11/97
1,1,2,2-Tetrachloroethane	< 5	5	ug/Kg	1	9/ 2/97	9/11/97
Acetone	27	10	ug/Kg	1	9/ 2/97	9/11/97
Carbon Disulfide	< 5	5	ug/Kg	1	9/ 2/97	9/11/97
2-Butanone	< 10	10	ug/Kg	1	9/ 2/97	9/11/97
2-Hexanone	< 10	10	ug/Kg	1	9/ 2/97	9/11/97
4-Methyl-2-Pentanone	< 10	10	ug/Kg	1	9/ 2/97	9/11/97

Note : Results are dry weight corrected

Client : Conestoga-Rovers
 Project ID : LENZ OIL SITE
 Site : LENZ OIL SITE

**EPA Target Compound List (TCL)
 GCMS Volatiles Analysis**

Lab Sample Number : L72972129-002
 Client ID : S-090397-WP-006

Method: 8260
 Matrix : SOIL

<u>Compound</u>	<u>Result</u>	<u>PQL</u>	<u>Units</u>	<u>Dilution Factor</u>	<u>Sample Date</u>	<u>Analysis Date</u>
Chloromethane	< 5	5	ug/Kg	1	9/ 3/97	9/ 9/97
Vinyl Chloride	< 5	5	ug/Kg	1	9/ 3/97	9/ 9/97
Bromomethane	< 5	5	ug/Kg	1	9/ 3/97	9/ 9/97
Chloroethane	< 5	5	ug/Kg	1	9/ 3/97	9/ 9/97
1,1-Dichloroethene	< 5	5	ug/Kg	1	9/ 3/97	9/ 9/97
Methylene Chloride	< 5	5	ug/Kg	1	9/ 3/97	9/ 9/97
trans-1,2-Dichloroethene	< 5	5	ug/Kg	1	9/ 3/97	9/ 9/97
1,1-Dichloroethane	< 5	5	ug/Kg	1	9/ 3/97	9/ 9/97
cis-1,2-Dichloroethene	< 5	5	ug/Kg	1	9/ 3/97	9/ 9/97
Chloroform	< 5	5	ug/Kg	1	9/ 3/97	9/ 9/97
1,1,1-Trichloroethane	< 5	5	ug/Kg	1	9/ 3/97	9/ 9/97
Carbon Tetrachloride	< 5	5	ug/Kg	1	9/ 3/97	9/ 9/97
Benzene	< 5	5	ug/Kg	1	9/ 3/97	9/ 9/97
1,2-Dichloroethane	< 5	5	ug/Kg	1	9/ 3/97	9/ 9/97
Trichloroethene	6	5	ug/Kg	1	9/ 3/97	9/ 9/97
1,2-Dichloropropane	< 5	5	ug/Kg	1	9/ 3/97	9/ 9/97
Bromodichloromethane	< 5	5	ug/Kg	1	9/ 3/97	9/ 9/97
cis-1,3-Dichloropropene	< 5	5	ug/Kg	1	9/ 3/97	9/ 9/97
Toluene	< 5	5	ug/Kg	1	9/ 3/97	9/ 9/97
trans-1,3-Dichloropropene	< 5	5	ug/Kg	1	9/ 3/97	9/ 9/97
1,1,2-Trichloroethane	< 5	5	ug/Kg	1	9/ 3/97	9/ 9/97
Tetrachloroethene	< 5	5	ug/Kg	1	9/ 3/97	9/ 9/97
Dibromochloromethane	< 5	5	ug/Kg	1	9/ 3/97	9/ 9/97
Chlorobenzene	< 5	5	ug/Kg	1	9/ 3/97	9/ 9/97
Ethylbenzene	< 5	5	ug/Kg	1	9/ 3/97	9/ 9/97
Xylenes, Total	18	10	ug/Kg	1	9/ 3/97	9/ 9/97
Styrene	< 5	5	ug/Kg	1	9/ 3/97	9/ 9/97
Bromoform	< 5	5	ug/Kg	1	9/ 3/97	9/ 9/97
1,1,2,2-Tetrachloroethane	< 5	5	ug/Kg	1	9/ 3/97	9/ 9/97
Acetone	20	10	ug/Kg	1	9/ 3/97	9/ 9/97
Carbon Disulfide	< 5	5	ug/Kg	1	9/ 3/97	9/ 9/97
2-Butanone	< 10	10	ug/Kg	1	9/ 3/97	9/ 9/97
2-Hexanone	< 10	10	ug/Kg	1	9/ 3/97	9/ 9/97
4-Methyl-2-Pentanone	< 10	10	ug/Kg	1	9/ 3/97	9/ 9/97

Note : Results are dry weight corrected

Client: Conestoga Rovers
 IEA Job#: L72972129
 Project ID: LENZ OIL SITE
 Method: 8260

Method Blank Report
 EPA Target Compound List (TCL)
 GCMS Volatiles Analysis
 µg/L

Analyte	Dilution Factor	1	1				PQL
	Client ID	Method Blank	Method Blank				
	Lab ID	VO090997	VO091197				
Chloromethane		U	U				5
Bromomethane		U	U				5
Vinyl Chloride		U	U				5
Chloroethane		U	U				5
Methylene Chloride		U	U				5
Acetone		U	U				10
Carbon Disulfide		U	U				5
1,1-Dichloroethene		U	U				5
1,1-Dichloroethane		U	U				5
cis-1,2-Dichloroethene		U	U				5
trans-1,2-Dichloroethene		U	U				5
Chloroform		U	U				5
1,2-Dichloroethane		U	U				5
2-Butanone		U	U				10
1,1, 1-Trichloroethane		U	U				5
Carbon Tetrachloride		U	U				5
Bromodichloromethane		U	U				5
1,2-Dichloropropane		U	U				5
Trans-1,3-dichloropropene		U	U				5
Trichloroethene		U	U				5
Dibromochloromethane		U	U				5
1,1,2-Trichloroethane		U	U				5
Benzene		U	U				5
cis-1,3-Dichloropropene		U	U				5
Bromoform		U	U				5
4-Methyl-2-Pentanone		U	U				10
2-Hexanone		U	U				10
Tetrachloroethene		U	U				5
1,1,2,2-Tetrachloroethane		U	U				5
Toluene		U	U				5
Chlorobenzene		U	U				5
Ethylbenzene		U	U				5
Styrene		U	U				5
Total Xylenes		U	U				10
Date Analyzed		9/9/97	9/11/97				

PQL = Practical Quantitation Limit

To obtain the sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

FORM II
VOLATILE ORGANIC SURROGATE RECOVERY

Lab Name : AEN
Matrix : (soil/water) Soil

Client Name : Conestoga Rovers
Method No. : 8260

	Sample No.	S1 (DCE) #	S2 (TOL) #	S3 (BFB) #	Other #	TOT OUT
01	VO090997	93%	96%	89%		0
02	QCCCK090997	87%	99%	92%		0
03	VO091197	87%	96%	90%		0
04	QCCCK091197	90%	95%	94%		0
05	L72972129-001	128% *	83%	104%		1
06	L72972129-001RE	142% *	78% *	100%		2
07	L72972129-002	105%	92%	103%		0
08	L72972129-002MS	101%	95%	115%		0
09	L72972129-002MD	99%	95%	136% *		1
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

S1 (DCE) = 1,2-Dichloroethane-d4	QC Limits
S2 (TOL) = Toluene-d8	70-121%
S3 (BFB) = Bromofluorobenzene	81-117%
Other= Not Used	74-121%

#--Column used to flag recovery values

*--Value outside QC Limits

D--Surrogates diluted out

Spike Recovery and RPD Summary Report

Method : K:\CHEMSTN\MSO\METHODS\TCLSOIL.M
 Title : Method 8240B/8260A in Soil; Calib on 8/11/97
 Last Update : Mon Aug 11 11:52:03 1997
 Response via : Initial Calibration

Non-Spiked Sample: MS05791.D

	Spike Sample	Spike Duplicate Sample
File ID :	MS05792.D	MS05793.D
Sample :	L72972129-002ms	L72972129-002msd
Acq Time:	9 Sep 97 19:22	9 Sep 97 20:02

Compound	Sample Conc	Spike Added	Spike Res	Dup Res	Spike %Rec	Dup %Rec	RPD	QC Limits	
								RPD	% Rec
1,1-dichloroethene	0.0	50	51	47	101	94	8	22	59-172
benzene	0.4	50	53	52	106	103	2	24	66-142
trichloroethene	5.1	50	56	54	102	98	4	21	62-137
oluene	0.7	50	51	50	100	98	2	21	59-139
chlorobenzene	0.4	50	51	54	101	107	6	21	60-133

- Fails Limit Check

TCLSOIL.M

Wed Sep 10 08:30:31 1997

FORM III
ORGANIC QC CHECK FORM

Lab Name : IEA, Inc.
Matrix : (soil/water) Soil

Sample No. : VO090997
Method No. : 8240B/8260A

COMPOUND	Spike Added (µg/Kg)	Sample Concentration (µg/Kg)	MS Concentration (µg/Kg)	MS % Rec #	QC Limits Rec.
1,1-Dichloroethene	50	0	50	100%	59-172
Trichloroethene	50	0	59	118%	62-137
Benzene	50	0	52	104%	66-142
Toluene	50	0	55	110%	59-139
Chlorobenzene	50	0	54	108%	60-133

#--Column to be used to flag recovery and RPD values with an asterisk

*--Values outside of QC Limits

Spike Recovery : 0 out of 5 outside limits

Comments: _____

FORM III
ORGANIC QC CHECK FORM

Lab Name : IEA, Inc. _____
Matrix : (soil/water) Soil _____

Sample No. : VO091197 _____
Method No. : 8240B/8260A _____

COMPOUND	Spike Added (µg/Kg)	Sample Concentration (µg/Kg)	MS Concentration (µg/Kg)	MS % Rec #	QC Limits Rec.
1,1-Dichloroethene	50	0	53	106%	59-172
Trichloroethene	50	0	59	118%	62-137
Benzene	50	0	52	104%	66-142
Toluene	50	0	54	108%	59-139
Chlorobenzene	50	0	52	104%	60-133

#--Column to be used to flag recovery and RPD values with an asterisk

*--Values outside of QC Limits

Spike Recovery : 0 out of 5 outside limits

Comments: _____



American Environmental Network

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September 16, 1997

Conestoga-Rovers
Steve Day
8615 W. Bryn Mawr Avenue

Chicago, IL 60631

Dear Steve Day:

Please find enclosed the analytical results of the samples received at our laboratory on September 11, 1997. This report contains sections addressing the following information at a minimum:

- Definitions
- Analytical Methodology
- Analytical Results
- Chain-of-custody

IEA Project#: L72972158

Client Project: 6711

Purchase Order#:

IEA Quote#:

Site: LENZ OIL

Copies of this analytical report and supporting data are maintained in our files for three years; samples are retained for two weeks unless special arrangements have been made. Unless specifically indicated, all analytical testing was performed at this laboratory and no portion of the testing was subcontracted.

We appreciate your selection of our services and welcome any questions or suggestions you may have relative to this report. Please contact Jim Dowse at (800) 933-2580 for any additional information. Thank you for utilizing our services, we hope you will consider us for your future analytical needs.

I have reviewed and approved the enclosed data for final release.

Sincerely

Larry D. Lewis
Director of Operations
IEA-Illinois / American Environmental Network

Sample Summary

IEA-Illinois
Laboratory ID Client ID

L72972158-001	GW-091097-KD-007
L72972158-002	GW-091097-KD-007
L72972158-003	GW-091097-KD-007
L72972158-004	GW-091097-KD-008
L72972158-005	GW-091097-KD-009
L72972158-006	GW-091097-KD-010
L72972158-007	GW-091097-KD-011
L72972158-008	GW-091097-KD-012
L72972158-009	TRIP BLANK

Client : Conestoga-Rovers
 Project ID : 6711
 Site : LENZ OIL

**EPA Target Compound List (TCL)
 GCMS Volatiles Analysis**

Lab Sample Number : L72972158-001

Client ID : GW-091097-KD-007

Method: 8260

Matrix : WATER

<u>Compound</u>	<u>Result</u>	<u>PQL</u>	<u>Units</u>	<u>Dilution Factor</u>	<u>Sample Date</u>	<u>Analysis Date</u>
Chloromethane	< 5	5	ug/L	1	9/10/97	9/12/97
Vinyl Chloride	< 5	5	ug/L	1	9/10/97	9/12/97
Bromomethane	< 5	5	ug/L	1	9/10/97	9/12/97
Chloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
1,1-Dichloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
Methylene Chloride	< 5	5	ug/L	1	9/10/97	9/12/97
trans-1,2-Dichloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
1,1-Dichloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
cis-1,2-Dichloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
Chloroform	< 5	5	ug/L	1	9/10/97	9/12/97
1,1,1-Trichloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
Carbon Tetrachloride	< 5	5	ug/L	1	9/10/97	9/12/97
Benzene	< 5	5	ug/L	1	9/10/97	9/12/97
1,2-Dichloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
Trichloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
1,2-Dichloropropane	< 5	5	ug/L	1	9/10/97	9/12/97
Bromodichloromethane	< 5	5	ug/L	1	9/10/97	9/12/97
cis-1,3-Dichloropropene	< 5	5	ug/L	1	9/10/97	9/12/97
Toluene	< 5	5	ug/L	1	9/10/97	9/12/97
trans-1,3-Dichloropropene	< 5	5	ug/L	1	9/10/97	9/12/97
1,1,2-Trichloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
Tetrachloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
Dibromochloromethane	< 5	5	ug/L	1	9/10/97	9/12/97
Chlorobenzene	< 5	5	ug/L	1	9/10/97	9/12/97
Ethylbenzene	< 5	5	ug/L	1	9/10/97	9/12/97
Xylenes, Total	< 10	10	ug/L	1	9/10/97	9/12/97
Styrene	< 5	5	ug/L	1	9/10/97	9/12/97
Bromoform	< 5	5	ug/L	1	9/10/97	9/12/97
1,1,2,2-Tetrachloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
Acetone	< 10	10	ug/L	1	9/10/97	9/12/97
Carbon Disulfide	< 5	5	ug/L	1	9/10/97	9/12/97
2-Butanone	< 10	10	ug/L	1	9/10/97	9/12/97
2-Hexanone	< 10	10	ug/L	1	9/10/97	9/12/97
4-Methyl-2-Pentanone	< 10	10	ug/L	1	9/10/97	9/12/97

Client : Conestoga-Rovers
 Project ID : 6711
 Site : LENZ OIL

**EPA Target Compound List (TCL)
 GCMS Volatiles Analysis**

Lab Sample Number : L72972158-004	Method: 8260
Client ID : GW-091097-KD-008	Matrix : WATER

<u>Compound</u>	<u>Result</u>	<u>PQL</u>	<u>Units</u>	<u>Dilution Factor</u>	<u>Sample Date</u>	<u>Analysis Date</u>
Chloromethane	< 5	5	ug/L	1	9/10/97	9/12/97
Vinyl Chloride	< 5	5	ug/L	1	9/10/97	9/12/97
Bromomethane	< 5	5	ug/L	1	9/10/97	9/12/97
Chloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
1,1-Dichloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
Methylene Chloride	< 5	5	ug/L	1	9/10/97	9/12/97
trans-1,2-Dichloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
1,1-Dichloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
cis-1,2-Dichloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
Chloroform	< 5	5	ug/L	1	9/10/97	9/12/97
1,1,1-Trichloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
Carbon Tetrachloride	< 5	5	ug/L	1	9/10/97	9/12/97
Benzene	< 5	5	ug/L	1	9/10/97	9/12/97
1,2-Dichloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
Trichloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
1,2-Dichloropropane	< 5	5	ug/L	1	9/10/97	9/12/97
Bromodichloromethane	< 5	5	ug/L	1	9/10/97	9/12/97
cis-1,3-Dichloropropene	< 5	5	ug/L	1	9/10/97	9/12/97
Toluene	< 5	5	ug/L	1	9/10/97	9/12/97
trans-1,3-Dichloropropene	< 5	5	ug/L	1	9/10/97	9/12/97
1,1,2-Trichloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
Tetrachloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
Dibromochloromethane	< 5	5	ug/L	1	9/10/97	9/12/97
Chlorobenzene	< 5	5	ug/L	1	9/10/97	9/12/97
Ethylbenzene	< 5	5	ug/L	1	9/10/97	9/12/97
Xylenes, Total	< 10	10	ug/L	1	9/10/97	9/12/97
Styrene	< 5	5	ug/L	1	9/10/97	9/12/97
Bromoform	< 5	5	ug/L	1	9/10/97	9/12/97
1,1,2,2-Tetrachloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
Acetone	< 10	10	ug/L	1	9/10/97	9/12/97
Carbon Disulfide	< 5	5	ug/L	1	9/10/97	9/12/97
2-Butanone	< 10	10	ug/L	1	9/10/97	9/12/97
2-Hexanone	< 10	10	ug/L	1	9/10/97	9/12/97
4-Methyl-2-Pentanone	< 10	10	ug/L	1	9/10/97	9/12/97

Client : Conestoga-Rovers
 Project ID : 6711
 Site : LENZ OIL

**EPA Target Compound List (TCL)
 GCMS Volatiles Analysis**

Lab Sample Number : L72972158-005	Method: 8260
Client ID : GW-091097-KD-009	Matrix : WATER

<u>Compound</u>	<u>Result</u>	<u>PQL</u>	<u>Units</u>	<u>Dilution Factor</u>	<u>Sample Date</u>	<u>Analysis Date</u>
Chloromethane	< 5	5	ug/L	1	9/10/97	9/12/97
Vinyl Chloride	< 5	5	ug/L	1	9/10/97	9/12/97
Bromomethane	< 5	5	ug/L	1	9/10/97	9/12/97
Chloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
1,1-Dichloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
Methylene Chloride	< 5	5	ug/L	1	9/10/97	9/12/97
trans-1,2-Dichloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
1,1-Dichloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
cis-1,2-Dichloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
Chloroform	< 5	5	ug/L	1	9/10/97	9/12/97
1,1,1-Trichloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
Carbon Tetrachloride	< 5	5	ug/L	1	9/10/97	9/12/97
Benzene	< 5	5	ug/L	1	9/10/97	9/12/97
1,2-Dichloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
Trichloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
1,2-Dichloropropane	< 5	5	ug/L	1	9/10/97	9/12/97
Bromodichloromethane	< 5	5	ug/L	1	9/10/97	9/12/97
cis-1,3-Dichloropropene	< 5	5	ug/L	1	9/10/97	9/12/97
Toluene	< 5	5	ug/L	1	9/10/97	9/12/97
trans-1,3-Dichloropropene	< 5	5	ug/L	1	9/10/97	9/12/97
1,1,2-Trichloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
Tetrachloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
Dibromochloromethane	< 5	5	ug/L	1	9/10/97	9/12/97
Chlorobenzene	< 5	5	ug/L	1	9/10/97	9/12/97
Ethylbenzene	< 5	5	ug/L	1	9/10/97	9/12/97
Xylenes, Total	< 10	10	ug/L	1	9/10/97	9/12/97
Styrene	< 5	5	ug/L	1	9/10/97	9/12/97
Bromoform	< 5	5	ug/L	1	9/10/97	9/12/97
1,1,2,2-Tetrachloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
Acetone	< 10	10	ug/L	1	9/10/97	9/12/97
Carbon Disulfide	< 5	5	ug/L	1	9/10/97	9/12/97
2-Butanone	< 10	10	ug/L	1	9/10/97	9/12/97
2-Hexanone	< 10	10	ug/L	1	9/10/97	9/12/97
4-Methyl-2-Pentanone	< 10	10	ug/L	1	9/10/97	9/12/97

Client : Conestoga-Rovers
Project ID : 6711
Site : LENZ OIL

**EPA Target Compound List (TCL)
GCMS Volatiles Analysis**

Lab Sample Number : L72972158-006

Client ID : GW-091097-KD-010

Method: 8260

Matrix : WATER

Compound	Result	PQL	Units	Dilution Factor	Sample Date	Analysis Date
Chloromethane	< 5	5	ug/L	1	9/10/97	9/12/97
Vinyl Chloride	< 5	5	ug/L	1	9/10/97	9/12/97
Bromomethane	< 5	5	ug/L	1	9/10/97	9/12/97
Chloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
1,1-Dichloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
Methylene Chloride	< 5	5	ug/L	1	9/10/97	9/12/97
trans-1,2-Dichloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
1,1-Dichloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
cis-1,2-Dichloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
Chloroform	< 5	5	ug/L	1	9/10/97	9/12/97
1,1,1-Trichloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
Carbon Tetrachloride	< 5	5	ug/L	1	9/10/97	9/12/97
Benzene	< 5	5	ug/L	1	9/10/97	9/12/97
1,2-Dichloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
Trichloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
1,2-Dichloropropane	< 5	5	ug/L	1	9/10/97	9/12/97
Bromodichloromethane	< 5	5	ug/L	1	9/10/97	9/12/97
cis-1,3-Dichloropropene	< 5	5	ug/L	1	9/10/97	9/12/97
Toluene	< 5	5	ug/L	1	9/10/97	9/12/97
trans-1,3-Dichloropropene	< 5	5	ug/L	1	9/10/97	9/12/97
1,1,2-Trichloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
Tetrachloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
Dibromochloromethane	< 5	5	ug/L	1	9/10/97	9/12/97
Chlorobenzene	< 5	5	ug/L	1	9/10/97	9/12/97
Ethylbenzene	< 5	5	ug/L	1	9/10/97	9/12/97
Xylenes, Total	< 10	10	ug/L	1	9/10/97	9/12/97
Styrene	< 5	5	ug/L	1	9/10/97	9/12/97
Bromoform	< 5	5	ug/L	1	9/10/97	9/12/97
1,1,2,2-Tetrachloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
Acetone	< 10	10	ug/L	1	9/10/97	9/12/97
Carbon Disulfide	< 5	5	ug/L	1	9/10/97	9/12/97
2-Butanone	< 10	10	ug/L	1	9/10/97	9/12/97
2-Hexanone	< 10	10	ug/L	1	9/10/97	9/12/97
4-Methyl-2-Pentanone	< 10	10	ug/L	1	9/10/97	9/12/97

Client : Conestoga-Rovers
Project ID : 6711
Site : LENZ OIL

**EPA Target Compound List (TCL)
GCMS Volatiles Analysis**

Lab Sample Number : L72972158-007	Method: 8260
Client ID : GW-091097-KD-011	Matrix : WATER

<u>Compound</u>	<u>Result</u>	<u>PQL</u>	<u>Units</u>	<u>Dilution Factor</u>	<u>Sample Date</u>	<u>Analysis Date</u>
Chloromethane	< 5	5	ug/L	1	9/10/97	9/12/97
Vinyl Chloride	< 5	5	ug/L	1	9/10/97	9/12/97
Bromomethane	< 5	5	ug/L	1	9/10/97	9/12/97
Chloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
1,1-Dichloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
Methylene Chloride	< 5	5	ug/L	1	9/10/97	9/12/97
trans-1,2-Dichloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
1,1-Dichloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
cis-1,2-Dichloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
Chloroform	< 5	5	ug/L	1	9/10/97	9/12/97
1,1,1-Trichloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
Carbon Tetrachloride	< 5	5	ug/L	1	9/10/97	9/12/97
Benzene	< 5	5	ug/L	1	9/10/97	9/12/97
1,2-Dichloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
Trichloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
1,2-Dichloropropane	< 5	5	ug/L	1	9/10/97	9/12/97
Bromodichloromethane	< 5	5	ug/L	1	9/10/97	9/12/97
cis-1,3-Dichloropropene	< 5	5	ug/L	1	9/10/97	9/12/97
Toluene	< 5	5	ug/L	1	9/10/97	9/12/97
trans-1,3-Dichloropropene	< 5	5	ug/L	1	9/10/97	9/12/97
1,1,2-Trichloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
Tetrachloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
Dibromochloromethane	< 5	5	ug/L	1	9/10/97	9/12/97
Chlorobenzene	< 5	5	ug/L	1	9/10/97	9/12/97
Ethylbenzene	< 5	5	ug/L	1	9/10/97	9/12/97
Xylenes, Total	< 10	10	ug/L	1	9/10/97	9/12/97
Styrene	< 5	5	ug/L	1	9/10/97	9/12/97
Bromoform	< 5	5	ug/L	1	9/10/97	9/12/97
1,1,2,2-Tetrachloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
Acetone	< 10	10	ug/L	1	9/10/97	9/12/97
Carbon Disulfide	< 5	5	ug/L	1	9/10/97	9/12/97
2-Butanone	< 10	10	ug/L	1	9/10/97	9/12/97
2-Hexanone	< 10	10	ug/L	1	9/10/97	9/12/97
4-Methyl-2-Pentanone	< 10	10	ug/L	1	9/10/97	9/12/97

Client : Conestoga-Rovers
 Project ID : 6711
 Site : LENZ OIL

**EPA Target Compound List (TCL)
 GCMS Volatiles Analysis**

Lab Sample Number : L72972158-008	Method: 8260
Client ID : GW-091097-KD-012	Matrix : WATER

Compound	Result	PQL	Units	Dilution Factor	Sample Date	Analysis Date
Chloromethane	< 5	5	ug/L	1	9/10/97	9/12/97
Vinyl Chloride	< 5	5	ug/L	1	9/10/97	9/12/97
Bromomethane	< 5	5	ug/L	1	9/10/97	9/12/97
Chloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
1,1-Dichloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
Methylene Chloride	< 5	5	ug/L	1	9/10/97	9/12/97
trans-1,2-Dichloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
1,1-Dichloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
cis-1,2-Dichloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
Chloroform	< 5	5	ug/L	1	9/10/97	9/12/97
1,1,1-Trichloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
Carbon Tetrachloride	< 5	5	ug/L	1	9/10/97	9/12/97
Benzene	< 5	5	ug/L	1	9/10/97	9/12/97
1,2-Dichloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
Trichloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
1,2-Dichloropropane	< 5	5	ug/L	1	9/10/97	9/12/97
Bromodichloromethane	< 5	5	ug/L	1	9/10/97	9/12/97
cis-1,3-Dichloropropene	< 5	5	ug/L	1	9/10/97	9/12/97
Toluene	< 5	5	ug/L	1	9/10/97	9/12/97
trans-1,3-Dichloropropene	< 5	5	ug/L	1	9/10/97	9/12/97
1,1,2-Trichloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
Tetrachloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
Dibromochloromethane	< 5	5	ug/L	1	9/10/97	9/12/97
Chlorobenzene	< 5	5	ug/L	1	9/10/97	9/12/97
Ethylbenzene	< 5	5	ug/L	1	9/10/97	9/12/97
Xylenes, Total	< 10	10	ug/L	1	9/10/97	9/12/97
Styrene	< 5	5	ug/L	1	9/10/97	9/12/97
Bromoform	< 5	5	ug/L	1	9/10/97	9/12/97
1,1,2,2-Tetrachloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
Acetone	< 10	10	ug/L	1	9/10/97	9/12/97
Carbon Disulfide	< 5	5	ug/L	1	9/10/97	9/12/97
2-Butanone	< 10	10	ug/L	1	9/10/97	9/12/97
2-Hexanone	< 10	10	ug/L	1	9/10/97	9/12/97
4-Methyl-2-Pentanone	< 10	10	ug/L	1	9/10/97	9/12/97

Client : Conestoga-Rovers
 Project ID : 6711
 Site : LENZ OIL

**EPA Target Compound List (TCL)
 GCMS Volatiles Analysis**

Lab Sample Number : L72972158-009
 Client ID : TRIP BLANK

Method: 8260
 Matrix : WATER

<u>Compound</u>	<u>Result</u>	<u>PQL</u>	<u>Units</u>	<u>Dilution Factor</u>	<u>Sample Date</u>	<u>Analysis Date</u>
Chloromethane	< 5	5	ug/L	1	9/10/97	9/12/97
Vinyl Chloride	< 5	5	ug/L	1	9/10/97	9/12/97
Bromomethane	< 5	5	ug/L	1	9/10/97	9/12/97
Chloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
1,1-Dichloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
Methylene Chloride	< 5	5	ug/L	1	9/10/97	9/12/97
trans-1,2-Dichloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
1,1-Dichloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
cis-1,2-Dichloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
Chloroform	< 5	5	ug/L	1	9/10/97	9/12/97
1,1,1-Trichloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
Carbon Tetrachloride	< 5	5	ug/L	1	9/10/97	9/12/97
Benzene	< 5	5	ug/L	1	9/10/97	9/12/97
1,2-Dichloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
Trichloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
1,2-Dichloropropane	< 5	5	ug/L	1	9/10/97	9/12/97
Bromodichloromethane	< 5	5	ug/L	1	9/10/97	9/12/97
cis-1,3-Dichloropropene	< 5	5	ug/L	1	9/10/97	9/12/97
Toluene	< 5	5	ug/L	1	9/10/97	9/12/97
trans-1,3-Dichloropropene	< 5	5	ug/L	1	9/10/97	9/12/97
1,1,2-Trichloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
Tetrachloroethene	< 5	5	ug/L	1	9/10/97	9/12/97
Dibromochloromethane	< 5	5	ug/L	1	9/10/97	9/12/97
Chlorobenzene	< 5	5	ug/L	1	9/10/97	9/12/97
Ethylbenzene	< 5	5	ug/L	1	9/10/97	9/12/97
Xylenes, Total	< 10	10	ug/L	1	9/10/97	9/12/97
Styrene	< 5	5	ug/L	1	9/10/97	9/12/97
Bromoform	< 5	5	ug/L	1	9/10/97	9/12/97
1,1,2,2-Tetrachloroethane	< 5	5	ug/L	1	9/10/97	9/12/97
Acetone	< 10	10	ug/L	1	9/10/97	9/12/97
Carbon Disulfide	< 5	5	ug/L	1	9/10/97	9/12/97
2-Butanone	< 10	10	ug/L	1	9/10/97	9/12/97
2-Hexanone	< 10	10	ug/L	1	9/10/97	9/12/97
4-Methyl-2-Pentanone	< 10	10	ug/L	1	9/10/97	9/12/97

Client: Conestoga Rovers
 IEA Job#: L72972158
 Project ID: 6711
 Method: 8260

Method Blank Report
 EPA Target Compound List (TCL)
 GCMS Volatiles Analysis
 µg/L

Analyte	Dilution Factor	1					PQL
	Client ID	Method Blank					
	Lab ID	VN091297					
Chloromethane		U					5
Bromomethane		U					5
Vinyl Chloride		U					5
Chloroethane		U					5
Methylene Chloride		U					5
Acetone		U					10
Carbon Disulfide		U					5
1,1-Dichloroethene		U					5
1,1-Dichloroethane		U					5
cis-1,2-Dichloroethene		U					5
trans-1,2-Dichloroethene		U					5
Chloroform		U					5
1,2-Dichloroethane		U					5
2-Butanone		U					10
1,1, 1-Trichloroethane		U					5
Carbon Tetrachloride		U					5
Bromodichloromethane		U					5
1,2-Dichloropropane		U					5
Trans-1,3-dichloropropene		U					5
Trichloroethene		U					5
Dibromochloromethane		U					5
1,1,2-Trichloroethane		U					5
Benzene		U					5
cis-1,3-Dichloropropene		U					5
Bromoform		U					5
4-Methyl-2-Pentanone		U					10
2-Hexanone		U					10
Tetrachloroethene		U					5
1,1,2,2-Tetrachloroethane		U					5
Toluene		U					5
Chlorobenzene		U					5
Ethylbenzene		U					5
Styrene		U					5
Total Xylenes		U					10
Date Analyzed		9/12/97					

PQL = Practical Quantitation Limit

To obtain the sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

FORM II
VOLATILE ORGANIC SURROGATE RECOVERY

Lab Name : AEN
Matrix : (soil/water) Water

Client Name : Conestoga Rovers
Method No. : 8260

	Sample No.	S1 (DCE) #	S2 (TOL) #	S3 (BFB) #	Other #	TOT OUT
01	VN091297	101%	98%	102%		0
02	QCKK091297	108%	103%	101%		0
03	L72972158-001	105%	101%	102%		0
04	L72972158-002MS	99%	102%	100%		0
05	L72972158-003MD	107%	103%	99%		0
06	L72972158-004	105%	104%	100%		0
07	L72972158-005	106%	100%	102%		0
08	L72972158-006	104%	101%	101%		0
09	L72972158-007	105%	102%	105%		0
10	L72972158-008	102%	98%	99%		0
11	L72972158-009	106%	100%	99%		0
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

S1 (DCE) = 1,2-Dichloroethane-d4

S2 (TOL) = Toluene-d8

S3 (BFB) = Bromofluorobenzene

Other= Not Used

QC Limits

76-114%

88-110%

86-115%

#--Column used to flag recovery values

*--Value outside QC Limits

D--Surrogates diluted out

FORM III
ORGANIC QC CHECK FORM

Lab Name : IEA, Inc.
Matrix : (soil/water) Water

Sample No. : VN091297
Method No. : 8240B/8260A

COMPOUND	Spike Added (µg/L)	Sample Concentration (µg/L)	MS Concentration (µg/L)	MS % Rec #	QC Limits Rec.
1,1-Dichloroethene	50	0	48	96%	61-145
Trichloroethene	50	0	53	106%	71-120
Benzene	50	0	51	102%	76-127
Toluene	50	0	49	98%	76-125
Chlorobenzene	50	0	46	92%	75-130

#--Column to be used to flag recovery and RPD values with an asterisk

*--Values outside of QC Limits

Spike Recovery : 0 out of 5 outside limits

Comments: _____

Spike Recovery and RPD Summary Report WAT1A

Method : K:\CHEMSTN\MSN\METHODS\TCLH2ON.M
 Title : Method 8240B/8260A in Water;TK ; Calib on 9/3/97
 Last Update : Thu Sep 04 09:50:32 1997
 Response via : Initial Calibration

Non-Spiked Sample: MSN5434.D

Spike Sample	Spike Duplicate Sample
File ID : MSN5435.D	MSN5436.D
Sample : L72972158-002ms	L72972158-003md
Acq Time: 12 Sep 97 16:04	12 Sep 97 16:42

Compound	Sample Conc	Spike Added	Spike Res	Dup Res	Spike %Rec	Dup %Rec	RPD	QC Limits RPD % Rec
1,1-dichloroethene	0.0	50	49	50	99	101	2	14 61-145
benzene	0.0	50	51	51	102	101	0	11 76-127
trichloroethene	0.0	50	49	52	99	104	5	14 71-120
toluene	0.0	50	51	54	102	108	6	13 76-125
chlorobenzene	0.0	50	50	51	100	102	2	13 75-130

- Fails Limit Check

TCLH2ON.M

Sun Sep 14 10:30:11 1997

G

APPENDIX G

DATA VALIDATION MEMOS

MEMO

TO: Walt Pochron

REFERENCE NO: 6711

FROM: Nancy Bergstrom *NMB*

DATE: October 1, 1997

RE: Data Quality Assessment and Validation for the Samples Collected from the Lenz Oil Site in Lemont, Illinois

The following details a data quality assessment and validation for the samples collected from the Lenz Oil Site in Lemont, Illinois. The samples, which are identified in Table 1, were analyzed for target compound list (TCL) volatile organic compounds (VOC) by American Environmental Network, Inc. (AEN, Inc., formerly IEA, Inc.) of Schaumburg, Illinois using method 8240 from "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA SW-846, 3rd Edition with promulgated Updates, November 1986. The quality control criteria used to assess the data were established by the methods of analysis.¹

Holding Time Period

The holding time period follows:

TCL VOC - 14 days from sample collection to completion of analysis

The samples were prepared and analyzed within the required holding time period.

Method Blank Samples

Contamination of samples contributed by laboratory conditions or procedures was monitored by the data from concurrent preparation and analysis of method blank samples. Target analytes were not detected in the method blank samples.

Surrogate Compound Percent Recoveries

Individual sample performance for the organic analyses was monitored by assessing surrogate compound percent recovery data. The surrogate recovery acceptance criteria was met.

¹ Application of quality assurance criteria was consistent with the relevant criteria in "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review", EPA-540/R-94/012, February 1994.

Laboratory Control Samples

Laboratory control sample (LCS) analysis serves to monitor the accuracy of the laboratory preparation and analysis methods. The LCS percent recoveries were acceptable.

MS/MSD Samples

To assess the accuracy and precision of the analytical methods relative to the sample matrices, MS/MSD percent recoveries and RPDs were determined. The percent recovery and RPD acceptance criteria were met for the MS/MSD samples.

Additional Quality Control Concerns

Several results for sample L-080797-WP-004 were qualified with an "E" by the laboratory. The "E" qualifier denotes that the concentration for a compound exceeds the calibration range of the instrument. A subsequent dilution diluted several of the compounds out of the sample. Therefore, the 1,1-dichloroethane, cis-1,2-dichloroethene, 1,1,1-trichloroethane, and benzene results from the undiluted run of sample L-080797-WP-004 should be used and should be qualified as estimated (J).

Overall assessment

The data were found to exhibit acceptable levels of accuracy and precision and are suitable for their intended use with the qualifications presented herein.

NMB/ko/1

Attachments

cc: S. Day

TABLE 1
SAMPLE IDENTIFICATION NUMBERS
LENZ OIL SITE
LEMONT, ILLINOIS

L-080797-WP-001
L-080797-WP-003
L-080797-WP-004

MEMO

TO: Walt Pochron

REFERENCE NO. 6711

FROM: Nancy Bergstrom *NMB*

DATE: October 2, 1997

C.C.: Steve Day

RE: Data Quality Assessment and Validation for the Soil and Groundwater Samples Collected from the Lenz Oil Site in Lemont, Illinois

The following details a data quality assessment and validation for the soil and groundwater samples collected from the Lenz Oil Site in Lemont, Illinois. The samples, which are identified in Table 1, were analyzed for target compound list (TCL) volatile organic compounds (VOC) by American Environmental Network, Inc. (AEN, Inc., formerly IEA, Inc.) of Schaumburg, Illinois using method 8260 from "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA SW-846, 3rd Edition with promulgated Updates, November 1986. The quality control criteria used to assess the data were established by the methods of analysis.¹

Holding Time Period

The holding time period follows:

TCL VOC - 14 days from sample collection to completion of analysis

The samples were prepared and analyzed within the required holding time period.

Method Blank Samples

Contamination of samples contributed by laboratory conditions or procedures was monitored by the data from concurrent preparation and analysis of method blank samples. Target analytes were not detected in the method blank samples.

Surrogate Compound Percent Recoveries

Individual sample performance for the organic analyses was monitored by assessing surrogate compound percent recovery data. Two surrogate recoveries violated the acceptance criteria and the results and quantitation limits for sample S-090297-WP-005

¹ Application of quality assurance criteria was consistent with the relevant criteria in "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review", EPA-540/R-94/012, February 1994, and "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review", EPA-540/R-94-013, February 1994.

should be qualified as estimated (J and UJ, respectively). The remaining surrogate recovery acceptance criteria was met.

Laboratory Control Samples

Laboratory control sample (LCS) analysis serves to monitor the accuracy of the laboratory preparation and analysis methods. The LCS percent recoveries were acceptable.

MS/MSD Samples

To assess the accuracy and precision of the analytical methods relative to the sample matrices, MS/MSD percent recoveries and RPDs were determined. The percent recovery and RPD acceptance criteria were met for the MS/MSD samples.

Field Quality Assurance/Quality Control (QA/QC)

The field QA/QC consisted of one field duplicate sample sets and one trip blank sample.

Overall precision for the sampling and analysis event was monitored using the results of field duplicate sample sets. Analytes were not detected in the field duplicate sample set.

To monitor potential cross-contamination of VOCs during sample transportation and storage, a trip blank sample was submitted to the laboratory for VOC analysis with each shipping cooler containing VOC samples. Target analytes were not reported as being detected in the trip blank sample.

Overall assessment

The data were found to exhibit acceptable levels of accuracy and precision and are suitable for their intended use with the qualifications presented herein.

NB/l0/2

Attachments

TABLE 1
SAMPLE IDENTIFICATION NUMBERS
LENZ OIL SITE
LEMONT, ILLINOIS

S-090297-WP-005
S-090397-WP-006
GW-091097-KD-007
GW-091097-KD-008
GW-091097-KD-009
GW-091097-KD-010
GW-091097-KD-011
GW-091097-KD-012

H

APPENDIX H

FIGURES ILLUSTRATING SHALLOW GROUNDWATER ANALYTICAL RESULTS FROM THE RI

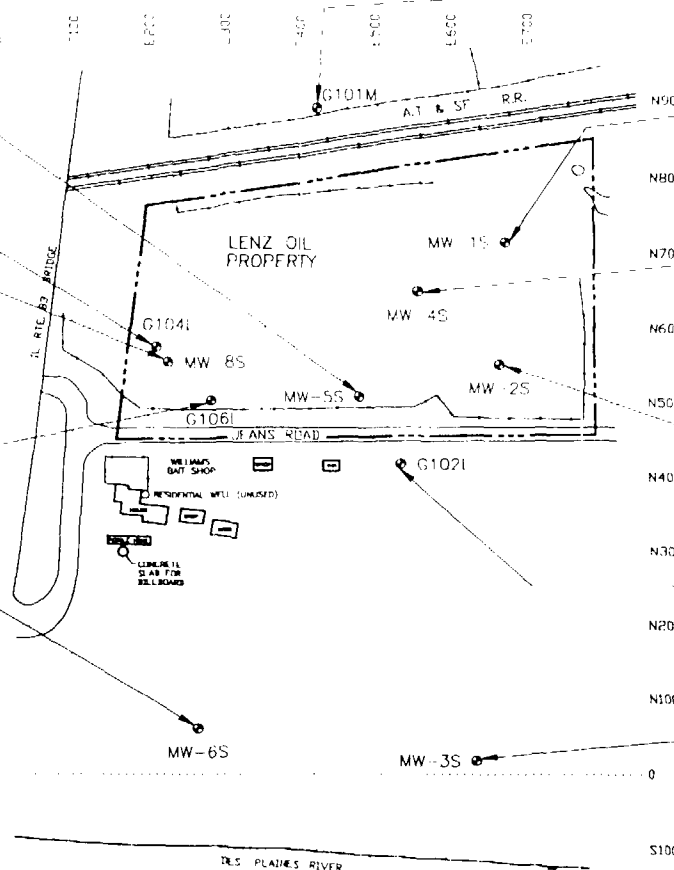
ANALYTE	ROUND 1	ROUND 2
ARSENIC*	DATA REJECTED	52
BARIUM*	DATA REJECTED	230
CALCIUM	DATA REJECTED	106,000
IRON*	DATA REJECTED	12,800
MAGNESIUM	DATA REJECTED	51,900
MANGANESE*	DATA REJECTED	387
POTASSIUM	DATA REJECTED	2,420
SODIUM*	DATA REJECTED	170,000

ROUND 1	ROUND 2
DATA REJECTED	NOT SAMPLED

ANALYTE	ROUND 1	ROUND 2
ALUMINUM*	NOT SAMPLED	88.3
ARSENIC*	NOT SAMPLED	3
BARIUM	NOT SAMPLED	66.7
CALCIUM	NOT SAMPLED	147,000
COBALT*	NOT SAMPLED	3.7
IRON*	NOT SAMPLED	642 J
MAGNESIUM	NOT SAMPLED	76,500
MANGANESE*	NOT SAMPLED	141 J
NICKEL	NOT SAMPLED	18.9
POTASSIUM	NOT SAMPLED	5,050
SODIUM*	NOT SAMPLED	164,000 J

ANALYTE	ROUND 1	ROUND 2
BARIUM*	DATA REJECTED	182
CALCIUM	DATA REJECTED	123,000
IRON*	DATA REJECTED	367
MAGNESIUM	DATA REJECTED	60,700
MANGANESE*	DATA REJECTED	42.2
POTASSIUM	DATA REJECTED	25,600
SODIUM	DATA REJECTED	264,000

ANALYTE	ROUND 1	ROUND 2
ARSENIC*	DATA REJECTED	2.4 J
BARIUM	DATA REJECTED	14.9
CALCIUM	DATA REJECTED	74,400
IRON*	DATA REJECTED	38.8
MAGNESIUM	DATA REJECTED	30,500
MANGANESE*	DATA REJECTED	35.4
POTASSIUM	DATA REJECTED	5,370
SODIUM	DATA REJECTED	24,800



ANALYTE	ROUND 1	ROUND 2
BARIUM	DATA REJECTED	17.6 J
CALCIUM	DATA REJECTED	111,000
COPPER	DATA REJECTED	5.1
MAGNESIUM	DATA REJECTED	57,400
NICKEL	DATA REJECTED	4.8
POTASSIUM	DATA REJECTED	2,110
SODIUM	DATA REJECTED	5,890

ANALYTE	ROUND 1	ROUND 2
ARSENIC*	DATA REJECTED	15.5
BARIUM	DATA REJECTED	99.8 J
CALCIUM	DATA REJECTED	152,000
IRON*	DATA REJECTED	1,840
MAGNESIUM	DATA REJECTED	78,300
MANGANESE*	DATA REJECTED	314
NICKEL	DATA REJECTED	6.9
POTASSIUM	DATA REJECTED	5,510
SODIUM*	DATA REJECTED	258,000

ANALYTE	ROUND 1	ROUND 2
ALUMINUM*	DATA REJECTED	1.71
ARSENIC*	DATA REJECTED	31.2
BARIUM	DATA REJECTED	43.2 J
CALCIUM	DATA REJECTED	203,000
IRON*	DATA REJECTED	873
MAGNESIUM	DATA REJECTED	224,000
MANGANESE*	DATA REJECTED	363
NICKEL	DATA REJECTED	12.3
POTASSIUM*	DATA REJECTED	49,900
SODIUM*	DATA REJECTED	861,000
VANADIUM*	DATA REJECTED	5.3
CYANIDE	DATA REJECTED	44.9 J

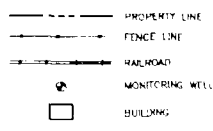
ANALYTE	ROUND 1	ROUND 2
ALUMINUM*	DATA REJECTED	170
BARIUM	DATA REJECTED	52 J
CALCIUM	DATA REJECTED	151,000
IRON*	DATA REJECTED	1,610 J
MAGNESIUM	DATA REJECTED	12,900
MANGANESE*	DATA REJECTED	284
NICKEL	DATA REJECTED	11.1
POTASSIUM	DATA REJECTED	5,380
SODIUM*	DATA REJECTED	195,000

ANALYTE	ROUND 1	ROUND 2
ARSENIC*	DATA REJECTED	7.5 J
BARIUM	DATA REJECTED	41.6 J
CALCIUM	DATA REJECTED	116,000
IRON*	DATA REJECTED	497 J
MAGNESIUM	DATA REJECTED	59,200
MANGANESE*	DATA REJECTED	152
NICKEL	DATA REJECTED	4.5
POTASSIUM	DATA REJECTED	5,770
SODIUM*	DATA REJECTED	147,000

ANALYTE	ROUND 1	ROUND 2
ARSENIC*	DATA REJECTED	3.3
BARIUM	DATA REJECTED	14.9 J
CALCIUM	DATA REJECTED	94,000
MAGNESIUM	DATA REJECTED	45,900
MANGANESE*	DATA REJECTED	15.8
POTASSIUM	DATA REJECTED	2,200
SODIUM	DATA REJECTED	26,400 J

APPROX. SCALE (FT.)
0 160

SYMBOL LEGEND:



NOTE: CONCENTRATIONS: (µg/L)

- KEY:
- * - ANALYTE DETECTED AT A CONCENTRATION MORE THAN ONE ORDER OF MAGNITUDE ABOVE THE BACKGROUND CONCENTRATION
 - J - QUANTITATION IS APPROXIMATE BECAUSE OF LIMITATIONS IDENTIFIED DURING THE QUALITY ASSURANCE REVIEW.
 - TAL - TARGET ANALYTE LIST

FIGURE 4-16

TAL DISSOLVED METALS AND CYANIDE IN
SHALLOW WELL SAMPLES
LENZ OIL SITE
LEMONT, ILLINOIS

ERM

APPENDIX I

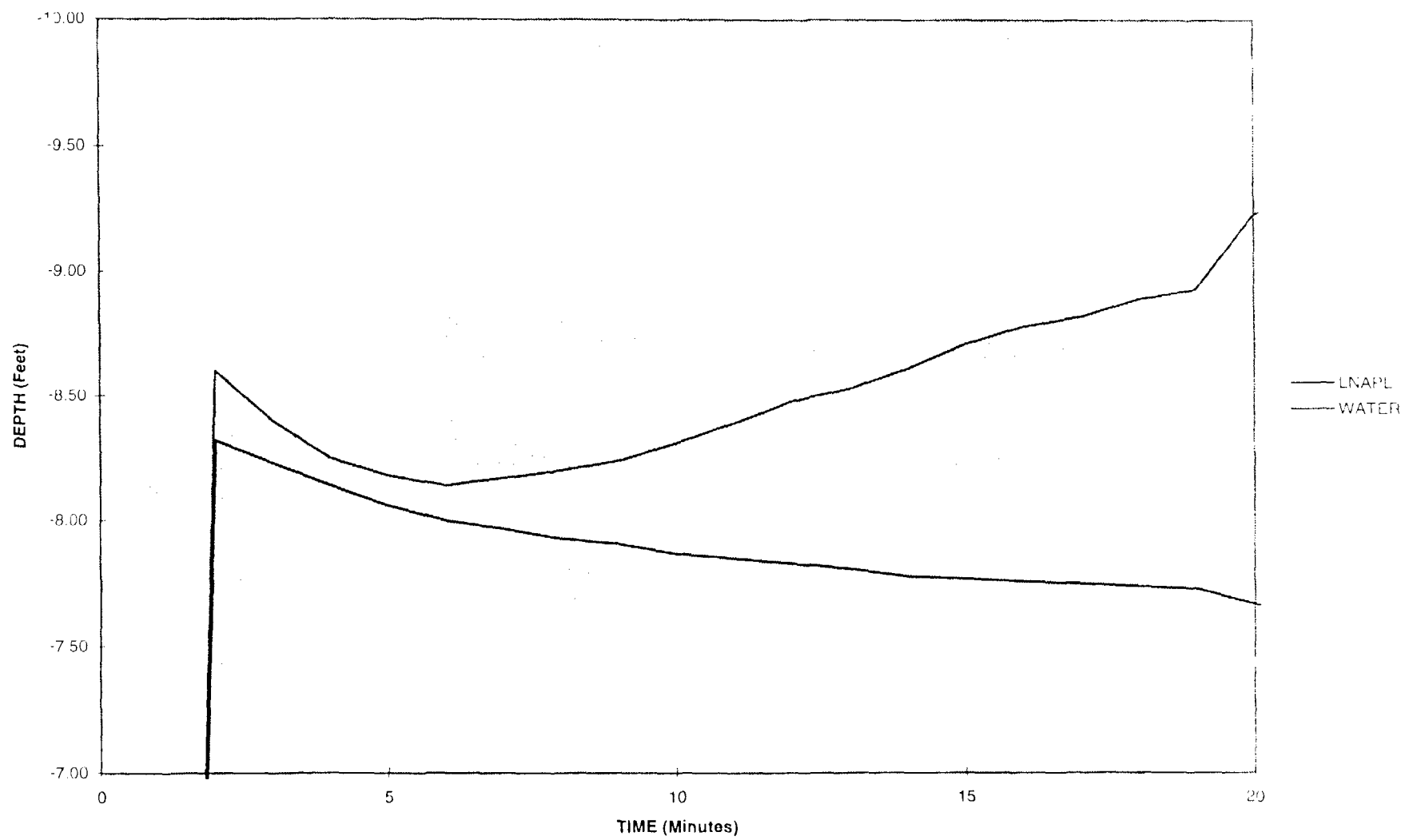
LNAPL RECOVERY DATA AND GRAPHS

**PRODUCT RECOVERY TEST
LENZ OIL SITE
LEMONT, ILLINOIS**

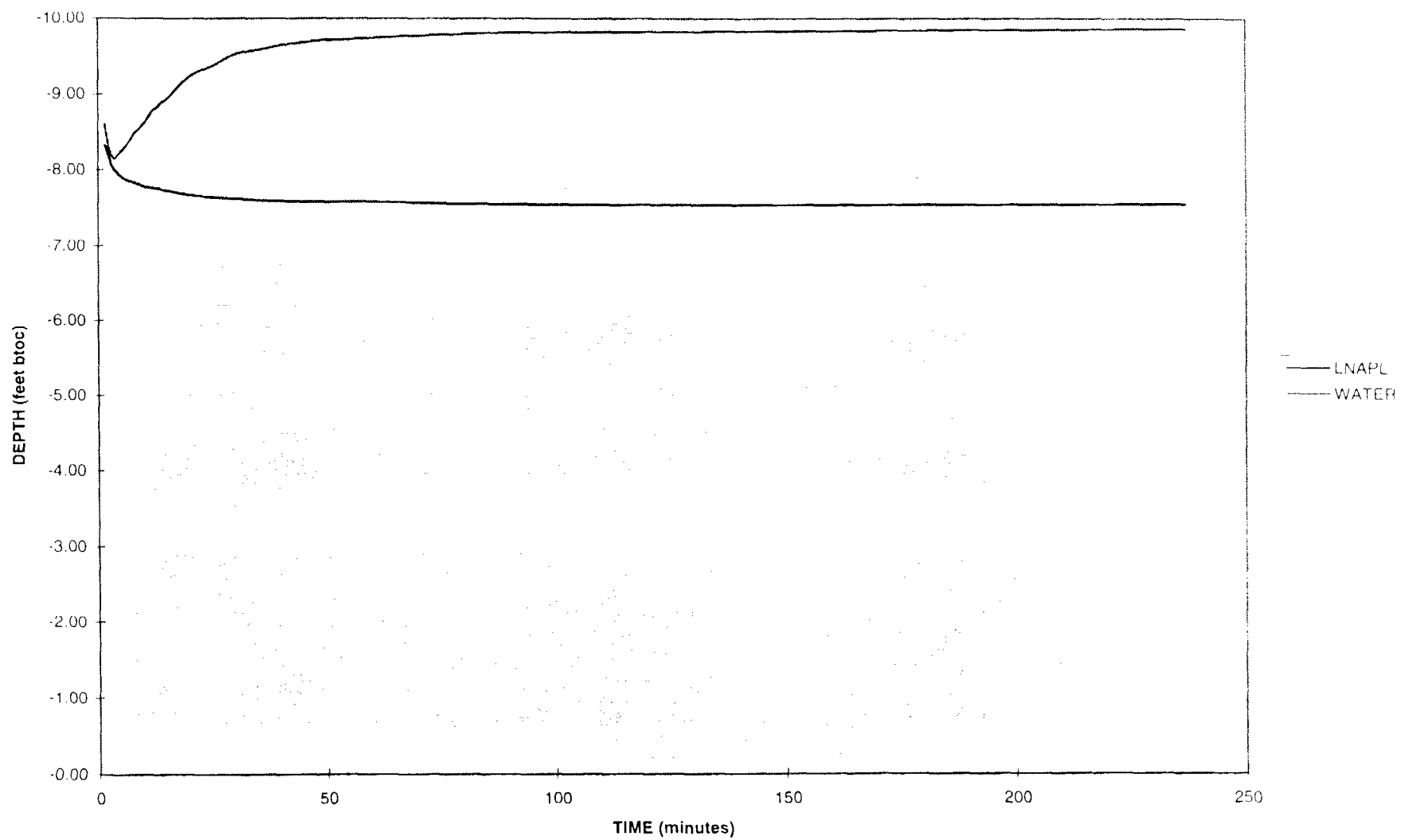
Well Tested P20
Date Tested 8-Sep-97
Pre-Test Data
Depth To LNAPL 7.09 feet btoc
Depth To Water 12.97 feet btoc

TIME (minutes)	LNAPL (feet btoc)	WATER (feet btoc)
1.5	-8.32	-8.60
2	-8.23	-8.40
2.5	-8.14	-8.25
3	-8.06	-8.18
3.5	-8.00	-8.14
4	-7.97	-8.17
4.5	-7.93	-8.20
5	-7.91	-8.24
6	-7.87	-8.31
7	-7.85	-8.39
8	-7.83	-8.48
9	-7.81	-8.53
10	-7.78	-8.61
11	-7.77	-8.71
12	-7.76	-8.78
13	-7.75	-8.82
14	-7.74	-8.89
15	-7.73	-8.93
20	-7.67	-9.23
25	-7.64	-9.37
30	-7.62	-9.52
35	-7.60	-9.58
40	-7.59	-9.64
45	-7.58	-9.68
50	-7.58	-9.71
55	-7.58	-9.72
60	-7.58	-9.74
75	-7.56	-9.78
90	-7.55	-9.81
148	-7.54	-9.83
237	-7.55	-9.86

WATER/LNAPL LEVELS vs. TIME P-20



WATER / LNAPL LEVELS vs. TIME P20



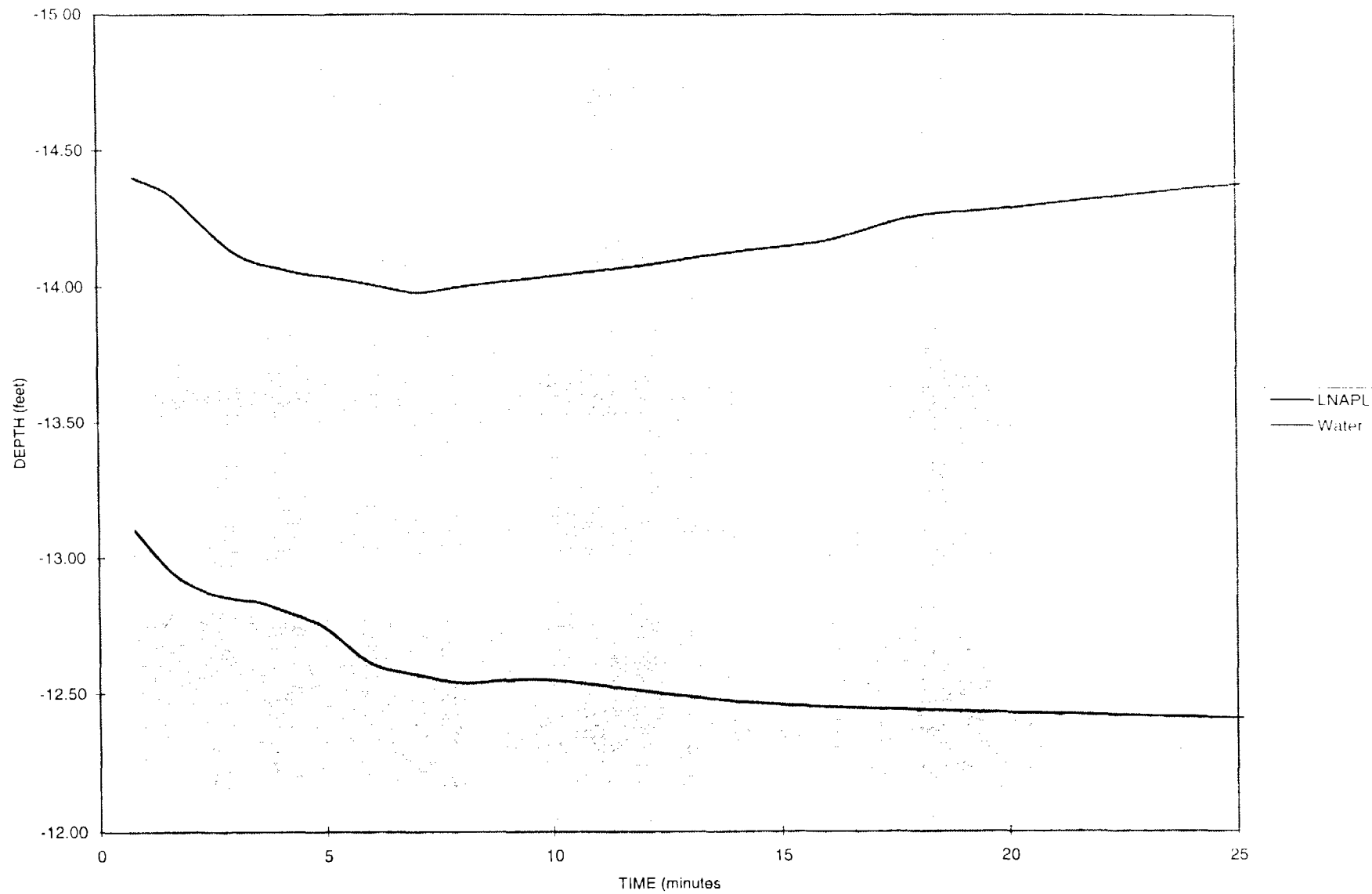
**PRODUCT RECOVERY TEST
LENZ OIL SITE
LEMONT, ILLINOIS**

Well Tested P19
Date Tested 10-Sep-97
Pre-Test Data
Depth To LNAPL 12.07 feet btoc
Depth To Water 16.55 feet btoc

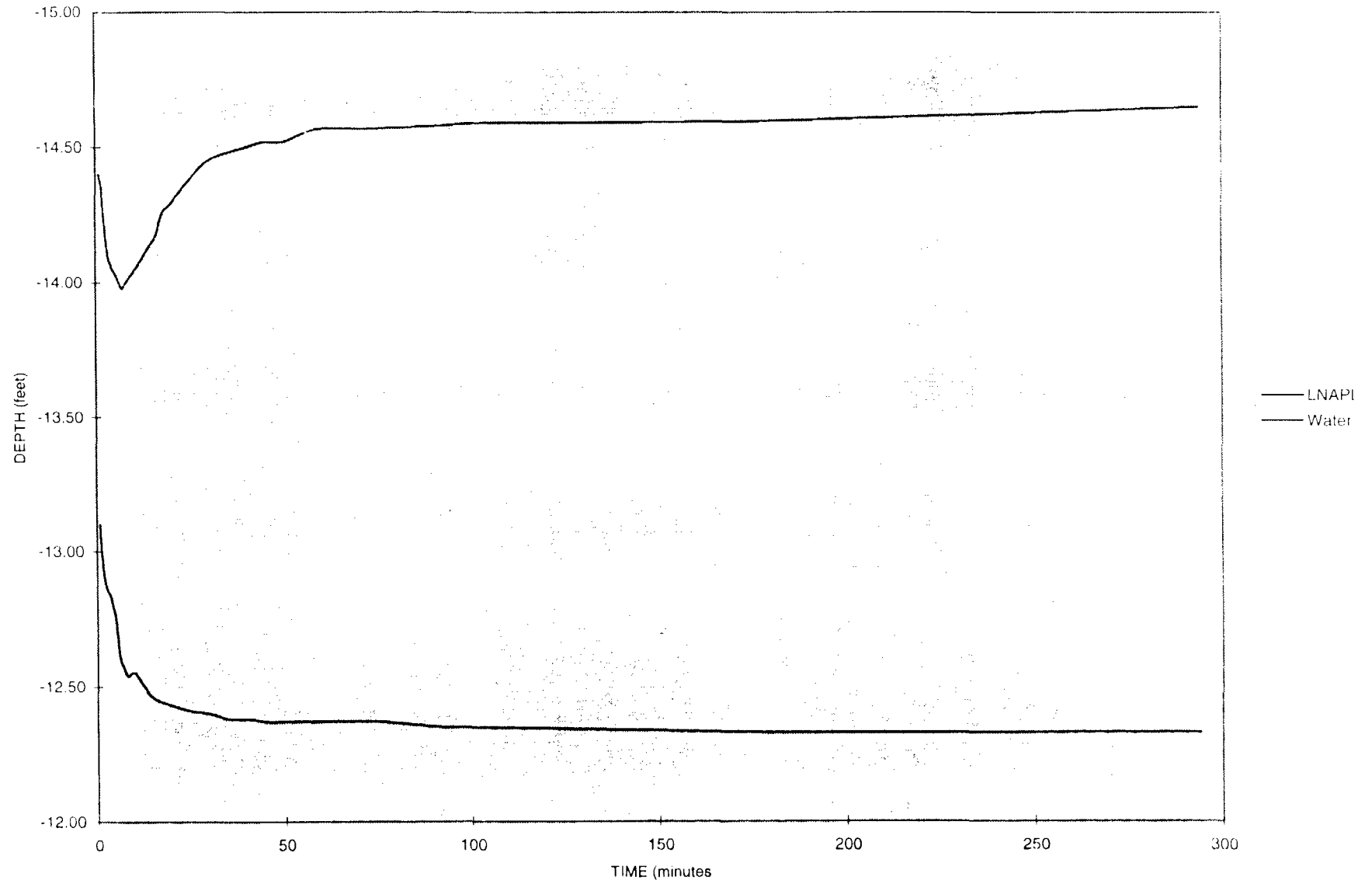
Time (minutes)	LN. PL (feet btoc)	Water (feet btoc)
0.80	-13.10	-14.40
1.6	-12.95	-14.34
2.3	-12.88	-14.23
3	-12.85	-14.13
3.5	-12.84	-14.09
4	-12.81	-14.07
4.5	-12.78	-14.05
5	-12.74	-14.04
6	-12.61	-14.01
7	-12.57	-13.98
8	-12.54	-14.00
9	-12.55	-14.02
10	-12.55	-14.04
12	-12.51	-14.08
14	-12.47	-14.13
16	-12.45	-14.17
18	-12.44	-14.26
20	-12.43	-14.29
25	-12.41	-14.38
30	-12.40	-14.45
35	-12.38	-14.48
40	-12.38	-14.50
45	-12.37	-14.52
50	-12.37	-14.52
55	-12.37	-14.55
60	-12.37	-14.57
75	-12.37	-14.57
92	-12.35	-14.58
105	-12.35	-14.59
185	-12.33	-14.60
294	-12.33	-14.65

Inflection at 1.46 feet

WATER /LNAPL LEVELS vs. TIME P19



WATER /LNAPL LEVELS vs. TIME P19



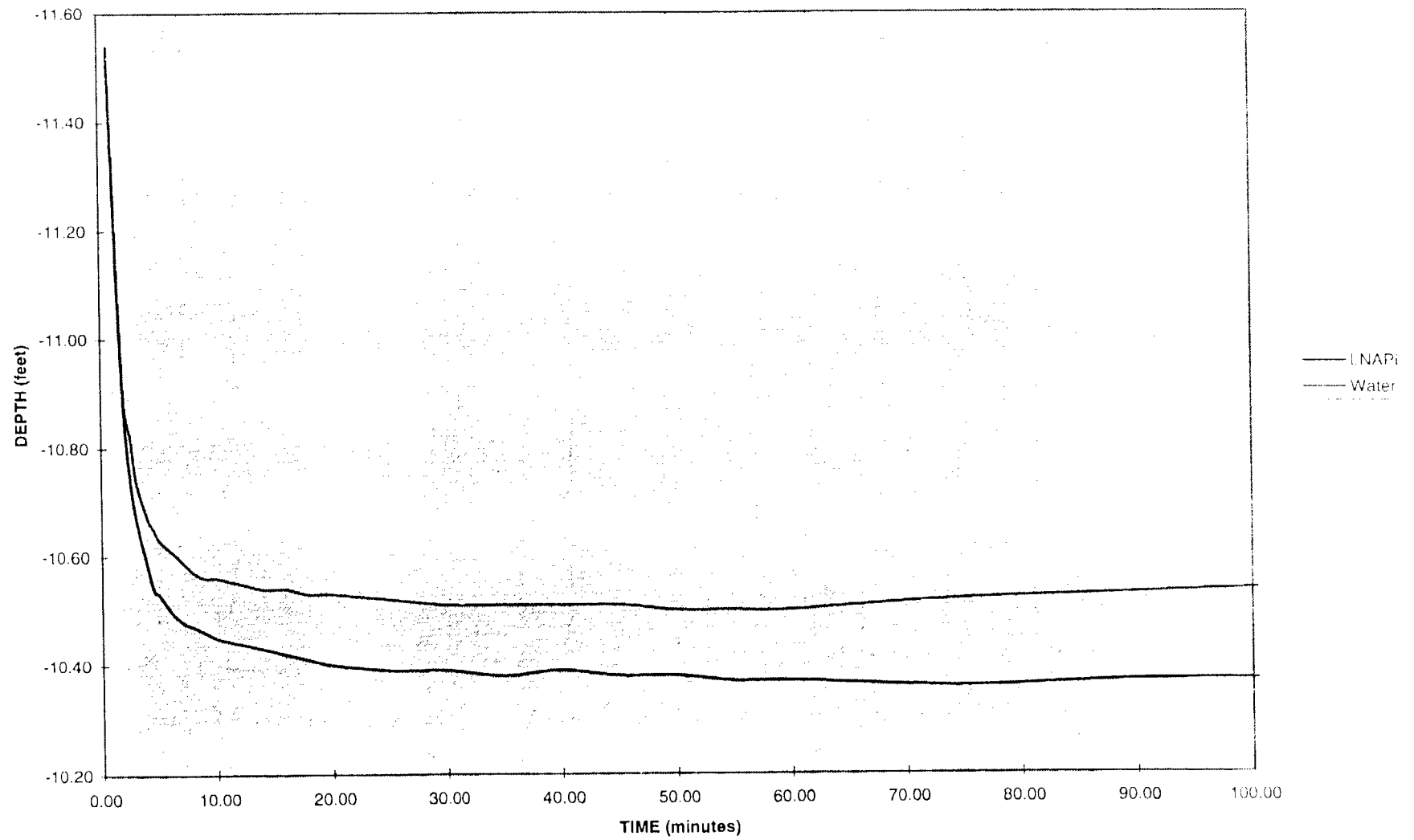
**PRODUCT RECOVERY TEST
LENZ OIL SITE
LEMONT, ILLINOIS**

Well Tested	G106L	
Date Tested	10-Sep-97	
Pre-Test Data	Measurements During Recovery Test Attempt 9/8/97	
Depth To LNAPL	10.26 feet btoc	9.92 feet btoc
Depth To Water	11.15 feet btoc	12.52 feet btoc

Time (minutes)	LNAPL (feet btoc)	Water (feet btoc)
0.80	-11.53	-11.54
1.5	-11.09	-11.11
2	-10.86	-10.88
2.5	-10.74	-10.82
3	-10.67	-10.74
4	-10.58	-10.67
4.5	-10.54	-10.65
5	-10.53	-10.63
6	-10.50	-10.61
7	-10.48	-10.59
8	-10.47	-10.57
9	-10.46	-10.56
10	-10.45	-10.56
12	-10.44	-10.55
14	-10.43	-10.54
16	-10.42	-10.54
18	-10.41	-10.53
20	-10.40	-10.53
25	-10.39	-10.52
30	-10.39	-10.51
35	-10.38	-10.51
40	-10.39	-10.51
45	-10.38	-10.51
50	-10.38	-10.50
55	-10.37	-10.50
60	-10.37	-10.50
75	-10.36	-10.52
90	-10.37	-10.53
105	-10.37	-10.54
120	-10.36	-10.54
242	-10.33	-10.57
336	-10.33	-10.57
436	-10.33	-10.57

Inflection at 0.16 feet

WATER / LNAPL LEVELS vs. TIME G106L



WATER / LNAPL LEVELS vs. TIME G106L

